WATER QUALITY MONITORING

OAKTON INSTRUMENTS

HANNA instruments CANADA

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TURNER DESIGNS
Reliable Instruments for an Unreliable World

LaMotte

Table of Contents

Pocket Testers
Oakton Pocket Testers page 4

Turbidity Meters
2020 Turbity Meter & 3000 Turbidity, Chlorine and Colorimeter page 5
EPA Compliant Turbidity Meter page 8
Analite Nep160 Turbidity Meter page 9
Databank Handheld Datalogger page 10

Colorimeters/Photometers
Flexible Photometers for Lab or Field page 11
Single Wavelength Colorimeters page 13
SMART Spectro Spectrophotometer page 14

Handheld Meters
YSI ProODO Dissolved Oxygen page 18
Handheld Optical Dissolved Oxygen Meter page 20
YSI Professional Plus page 22

Fluorometers
Aquafluor™ Handheld Fluorometer/ Turbidimeter page 24
Trilogy Laboratory Fluorometer page 26
10-AU Field Fluorometer page 28
Cyclops–7 Submersible Sensors page 30
C-3 Submersible Fluorometer page 31
C-6 Multi-Sensor Platform page 33
PhytoFlash Active Fluorometer page 35

UV Nitrate Analyzer
SUNA V2 (Submersible Ultraviolet Nitrate Analyzer) page 37

Sondes
HOBO U26 Optical Dissolved Oxygen Logger page 38
HOBO Conductivity Data Logger page 40
EXO - Advanced Water Quality Monitoring Platform page 42
YSI 600QS (Quick Sample™) page 45
Analite Nep495 Turbidity & Temperature Logging Probe page 47
600OMS V2 Optical Monitoring System page 49
600XL V2-1 and 600XLM V2-1 Sondes page 51
YSI 6820 and 6920 V2 Sondes page 53
YSI 6600 V2 Sonde page 55
6600 EDS Extended Deployment System page 57
YSI 6500 Monitoring System page 59
YSI 6-Series Anti-Fouling Kits page 62
YSI Oil in Water Sensor Adapter Kit page 64

Buoys
EMM68 Buoy page 66
EMM350 Buoy page 68

Profiling Systems
Vertical Profiling for Continuous Monitoring page 70
YSI Castaway CTD page 72

Autonomous Underwater Vehicles
Ecomapper AUV page 74

Specialized Oxygen Sensors
Presens Non-Invasive Oxygen Sensors page 76
Presens Oxygen Microsensors page 78
Presens Imaging Solutions Visisens page 80

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Oakton Pocket Testers

Great for water, wastewater, laboratory or plant use, these multiparameter Testers feature long-life pH electrodes with a wide range of sample compatibility. Pin-style conductivity sensors feature stainless steel electrodes for chemical resistance and durability. Replaceable sensor module saves you money by reusing the meter body. Advanced features include auto-shutoff, user-adjustable temperature coefficient, and low-battery indicator.

WD-35634-30

OAKTON ® Waterproof pHTestr ™ 30 with double-junction

pH Range: -1.00 to 15.00pH, ±0.01 pH (resolution 0.01 pH)
Temperature Display: 0 to 50°C (32 to 122°F)
The pHTestr 30 features three-point calibration, simultaneous temperature display and a replaceable double-junction electrode.
Includes:detachable electrode sensor, batteries and instructions.

WD-35662-35

Oakton Portable Waterproof ECTestr 11+.

Conductivity Range: 0 to 200.0 µS, 0 to 2000 µS, 0 to 20.00 mS
Conductivity Resolution: 0.1 µS, 1 µS, 0.01 mS
Conductivity Accuracy: ±1% full-scale
Temperature Range: 0 to 50°C, ±0.5°C (resolution 0.1°C)
The ECTestr 11+ offers One-point push-button calibration and is waterproof and dustproof.
Replaces ECTestr Pure+, ECTestr Low+, and the ECTestr High+, making all three separate scales selectable in one portable large display tester.
Includes: protective plastic storage case, lanyard, and batteries.

WD-35425-00

Oakton PCTestr 35 Portable Waterproof pH and Conductivity Tester.

pH Range: 0.0 to 14.0 pH, ±0.1 pH (resolution 0.1 pH).
Conductivity Ranges: 0 to 1999 S/cm; 2.00 to 20.00 ms/cm, ±1% full scale (resolution 1 S/cm; 0.01 mS/cm).
Temperature Display: 0 to 50°C (32 to 122°F)
The PCTestr 35 features up to five-point pH calibration, conductivity auto ranging based on the concentration of your sample, simultaneous temperature display and a replaceable sensor unit.
Includes: detachable sensor, clear plastic case, batteries and instructions.

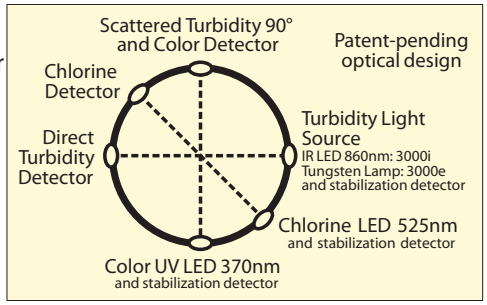
TC-3000 - Turbidity, Chlorine & Colour
TC-2020 - Turbidity

TC-3000 Tri Meters

TC-3000e Kit • Order Code 1964-EPA
Turbidity, Chlorine, and Color meter, turbidity complies with USEPA 180.1 Standard

TC-3000i Kit • Order Code 1964-ISO
Turbidity, Chlorine, and Color meter, turbidity complies with ISO 7027 Standard

Six detector design allows for long-term stability over a wide range of operational conditions. Kit supplied with 0, 1, and 10 NTU standards, sample bottle, 4 sample tubes, DPD tablets, and extra battery.



2-YEAR WARRANTY

ULTRA RUGGED, WATERPROOF CARRYING CASE!

Turbidity Specifications:

Unit of Measure	NTU, FNU, FAU, ASBC, EBC
Range	0-4000
Resolution	0.01 NTU/FNU 0.00-10.99 0.1 NTU/FNU 11.00-109.9 1 NTU/FNU 110-4000
Accuracy	±2%
Range Selection	Automatic
Detection Limit	0.05 NTU/FNU
Reproducibility	0.02 NTU/FNU, 0.5 FAU
Light Source	860nm LED (ISO) Tungsten (EPA)

Chlorine Specifications:

Range	0-10 ppm
Resolution	0.01 ppm (0-5) 0.1 ppm (5-10)
Accuracy	0.02 or ±2%
Detection Limit	0.02 ppm
Response Time	<5 Seconds
Light Source	525 nm LED

Color Specifications:

Range	0-500 cu
Accuracy	±0.5 cu or 2%
Detection Limit	0.2 cu
Light Source	375 nm UV LED
Resolution	0.1 cu (0-99.9 cu)

Meter Features:

Signal Averaging	Disabled, 2, 5, 10
Battery	9V
AC Power	Optional
Data Logging	4000 points
Auto Shut-Off	Disabled, 5, 10, 30
Optional Software	SmartLink 2
Languages	English, French, Spanish, Japanese, Italian, Portuguese
Response Time	<5 Seconds

- MSP430 Microcontroller used is the most advanced controller on the market for hand held applications
- Advanced calibration algorithms
- Tube positioning ring limits tube variability
- Easy menu driven operation and large LCD display
- 4000 point data log, stored results can be viewed directly on instrument or downloaded to a computer via RS-232 cable

2020 Turbidity Meters

2020e Kit • Order Code 1979-EPA
Turbidity complies with USEPA 180.1 Standard

2020i Kit • Order Code 1979-ISO
Turbidity complies with ISO 7027 Standard

2-YEAR WARRANTY

ULTRA RUGGED, WATERPROOF CARRYING CASE!

Turbidity Specifications:

Unit of Measure	NTU, FNU, FAU, ASBC, EBC
Range	0-4000
Resolution	0.01 NTU/FNU 0.00-10.99 0.1 NTU/FNU 11.00-109.9 1 NTU/FNU 110-4000
Accuracy	±2%
Detection Limit	0.05 NTU/FNU
Range Selection	Automatic
Reproducibility	0.02 NTU/FNU, 0.5 FAU
Light Source	860nm LED (ISO) Tungsten (EPA)

Meter Features:

Signal Averaging	Disabled, 2, 5, 10
Battery	9V
AC Power	Optional
Data Logging	4000 points
Auto Shut-Off	Disabled, 5, 10, 30
Optional Software	SmartLink 2
Languages	English, French, Spanish, Japanese, Italian, Portuguese
Response Time	<5 Seconds

Ideally suited for both low-level drinking water applications as well as monitoring high turbidity in the field.

2020e version meets USEPA design specifications for NPDWR and NPDES turbidity monitoring programs as specified by USEPA method 180.1

2020i version meets design criteria for quantitative methods of turbidity using optical turbidimeters as specified by ISO 7027.

Kits supplied with 0, 1, and 10 NTU standard, sample bottle, four sample tubes, and an extra battery.

Kits and Accessories

TC-3000e Kit • Order Code 1964-EPA
Turbidity, Chlorine, and Color meter, turbidity complies with USEPA 180.1 Standard

TC-3000i Kit • Order Code 1964-ISO
Turbidity, Chlorine, and Color meter, turbidity complies with ISO 7027 Standard

1964-EPA	TC-3000 Kit, EPA version
1964-ISO	TC-3000 Kit, ISO version
1754	AC adapter (variable 100-240V AC)
0641	Vial Ring (2-pk)
0475	Six pack of vials
1480	0 NTU Standard (ISO and EPA), 60 mL
1481	1 NTU Standard (ISO), 60 mL
1482	10 NTU Standard (ISO), 60 mL
1483	100 NTU Standard (ISO), 60 mL
1484	1 NTU Standard (EPA), 60 mL
1485	10 NTU Standard (EPA), 60 mL
1486	100 NTU Standard (EPA), 60 mL
6195-H	Formazin standard solution, 4000 NTU (60 mL bottle)
4140	DPD Chlorine secondary standards kit
3176-01	FAS-DPD Titration kit for chlorine titration
6973-H	Standard chlorine solution, 250 ppm (60 mL bottle)
6973-L	Standard chlorine solution, 250 ppm (475 mL bottle)
3858-H	Permanganate solution, 1000 ppm (60 mL bottle)
3858-L	Permanganate solution, 1000 ppm (60 mL bottle)
6903A-J	Chlorine DPD #1 instrument grade tablets (100 tablet box)
6197A-J	Chlorine DPD #3 instrument grade tablets (100 tablet box)
P-6740-H*	Liquid DPD 1A reagent (60 mL bottle)
P-6741-H*	Liquid DPD 1B reagent (60 mL bottle)
P-6743-H*	Liquid DPD 3 reagent (60 mL bottle)

*Note: DPD 1A and DPD 1B are both required to test free residual chlorine and DPD1A, DPD1B and DPD 3 are required for testing total residual chlorine.

2020e Kit • Order Code 1979-EPA
Turbidity meter complies with USEPA 180.1 Standard

2020i Kit • Order Code 1979-ISO
Turbidity meter complies with ISO 7027 Standard

1979-EPA	2020e Kit, EPA version
1979-ISO	2020i Kit, ISO version
1754	AC adapter (110V and 220V)
0641	Vial Ring (2-pk)
0475	Six pack of vials
1480	0 NTU Standard (ISO and EPA), 60 mL
1481	1 NTU Standard (ISO), 60 mL
1482	10 NTU Standard (ISO), 60 mL
1483	100 NTU Standard (ISO), 60 mL
1484	1 NTU Standard (EPA), 60 mL
1485	10 NTU Standard (EPA), 60 mL
1486	100 NTU Standard (EPA), 60 mL
6195-H	Formazin standard solution, 4000 NTU (60 mL bottle)

HI 98703

EPA Compliant Turbidity Meter

FeaturesHANNA 's Exclusive Fast Tracker™(T.I.S.)

FastTracker™
A new revolution in organized data management

SPECIFICATIONS	HI 98703
Range	0.00 to 9.99; 10.0 to 99.9 and 100 to 1000 NTU
Range Selection	Automatic
Resolution	0.01 NTU from 0.00 to 9.99 NTU; 0.1 NTU from 10.0 to 99.9 NTU; 1 NTU from 100 to 1000 NTU
Accuracy	±2% of reading plus 0.02 NTU
Repeatability	±1% of reading or 0.02 NTU, whichever is greater
Stray Light	< 0.02 NTU
Typical EMC Deviation	±0.05 NTU
Light Detector	Silicon Photocell
Light Source	Tungsten filament lamp
Lamp life	Greater than 100,000 readings
Method	Ratio Nephelometric Method (90°), ratio of scattered and transmitted light; Adaptation of the USEPA Method 180.1 and Standard Method 2130 B.
Measuring mode	Normal, Average, Continuous
Turbidity Standards	<0.1, 15, 100 and 750 NTU
Calibration	Two, three or four-point calibration
LOG Memory	200 records
Serial Interface	USB or RS 232
Environment	Up to 50°C (122°F); max 95% RH non-condensing
Power Supply	(4) 1.5V AA alkaline batteries or AC adapter; Auto-off after 15 minutes of non-use
Dimensions / Weight	224 x 87 x 77 mm (8.8 x 3.4 x 3.0") / 512 g (18 oz.)

ORDERING INFORMATION

HI 98703-01 (115V) and HI 98703-02 (230V) are supplied with (5) sample cuvets and caps, HI 98703-11 calibration cuvets, HI 93703-58 silicone oil, cuvet wiping tissue, (4) batteries, AC adapter, instruction manual and rugged carrying case.

SOLUTIONS

HI 98703-11	Turbidity standards kit
HI 93703-50	Cuvet cleaning solution, 250 mL

ACCESSORIES

HI 920005	Tag holders with tags (5)
HI 98703-58	Silicone oil (15 mL)
HI 93703-60	Caps for cuvets (4)
HI 731318	Tissue for wiping cuvets (4)
HI 731331	Glass cuvets (4)
HI 92000	Windows® compatible software
HI 920011	5 to 9 pin RS232 connection cable
HI 920013	USB cable for PC connection

EPA Compliant Turbidity Measurement

The HI 98703 meets and exceeds the requirements of the USEPA Method 180.1 for wastewater and Standard Method 2130 B for drinking water.

The HI 98703 measures the turbidity of a sample in the 0.00 to 1000 NTU (Nephelometric Turbidity Units) range. An effective algorithm calculates and converts the readings in NTU. The instrument has an EPA compliance reading mode which rounds the reading to meet EPA reporting requirements. Depending on the measured probe and needed accuracy, normal, continuous, or signal averaging measurement can be selected.

HI 98703 has GLP (Good Laboratory Practice) functions that allow traceability of the calibration conditions. The last calibration points, time and date can be checked at any time by a single touch.

HI 98703 has a user-friendly interface with a backlit, easy to read, large LCD (Liquid Crystal Display). The display codes guide the user step by step with routine operation and through calibration.

With it's logging function, up to 200 measurements can be stored in the internal memory and consulted at any time. In order to further store and analyze, the data can be downloaded to a PC using by either RS232 or USB.

For advanced field applications, the HI 98703 turbidimeter is equipped with Fast Tracker™—Tag Identification System (T.I.S.) that makes data collecting and management simpler than ever.

- Tungsten light source—EPA compliant turbidity measurement
- High accuracy at low ranges (below 0.05 NTU)
- Exclusive Fast Tracker™
- 2, 3 or 4 point calibration
- USB and RS232 PC connectivity
- Backlit LCD
- GLP capability
- User friendly display with guidance codes
- Battery percentage on display
- Continuous current time on display

ANALITE NEP160 TURBIDITY METER
for Field and Laboratory Applications

The ANALITE NEP160 is a truly portable turbidity meter. Readings are taken by simply inserting the probe into the steam or media to get an immediate result truly representative of the turbidity level at that point and time. It allows for easy and fast multiple readings at a site to ascertain the real turbidity profile of a stream or water body.

The ANALITE 160 turbidity meter allows the user to set up measurement parameters through a user-friendly menu system displayed on the in-built 2 line alphanumeric display.

All ANALITE NEP160 compliant probes are “hot swappable” and contain their calibration data in the probe proper thereby avaoiding the need to calibrate every time another probe is connected. The NEP160 (and its probes) comes supplied precalibrated however the user can calibrate a probe at any time using the simple menu driven interface. Both 2 and 3 point calibrations can be preformed.

The NEP160 comes complete in a convenient carry case. The carry case can accommodate a probe with a cable length of up to 10 meters, an ac adapter, the display unit, the RS232 cabling and the User Manual.

Specifications:

Range:	0 to 30,000NTU (3,000NTU limit on NEP260, 90° probe) over four ranges automatically determined.
Display:	2 line, 16-character dot matrix alphanumeric liquid crystal display.
Displayed:	Turbidity (NTU) - default Relative Turbidity Reference (NTU) Relative Turbidity REL (Turbidity - Relative Turbidity Reference) Date/Time - default
Reading:	Updated approximately every 1 second.
Averaging period:	0.5 second or 8 seconds nominal – user selectable.
Range Steps:	1 <0.1 to 20NTU 2 <1 to 200NTU 3 <10 to 2,000NTU 4 <100 to 20,000NTU
Resolution	1 0.02NTU 2 0.1NTU 3 1NTU 4 10NTU
Repeatability:	2% ± 1 digit on all ranges.
Data Logging:	User set for one reading every 1 to 90 seconds or minutes. All readings stored in the Notepad.
Notepad:	100 readings each with time and date.
Setup :	Menu driven, including: – Calibration – Automatic Logging – Analogue Output range selection – Reference Turbidity value – Setting date and time.
Setup Memory:	Non volatile EEPROM.
Clock:	Calendar clock displays date and time.
GLP:	Good Laboratory Practice. All readings as well as calibration constants are stored together with the Time and Date and can be recalled at any time.
Analogue Output:	0 – 2 volts full scale corresponding to preset measurement range. Output impedance 600 ohms nominal.
Power:	***Internal:*** 6V NiMH rechargeable battery. ***External:*** 10 to 16V dc, 400mA max. incl. NiMH Charge current. External power connection is via jack plug male with 2.5mm pin. Centre pin is NEGATIVE polarity.

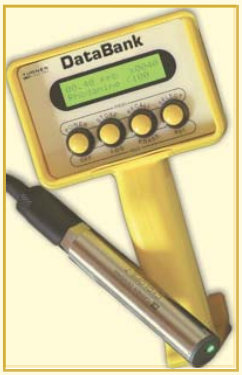
Outputs:	Inbuilt LCD, analogue output and RS232 port.
RS232 Port :	The RS232 port can output readings on request or at preset intervals of time from 1 to 99 seconds or minutes. The Notepad memory can also be downloaded on request. 4800 baud rate, 8 bits, no parity, 1 stop bit, Xon/Xoff protocol.
Dimensions:	187mm x 110mm x 51mm (display unit). 238mm x 32mm dia (probes incl gland).
Weight:	Display Unit 0.5kg. 180° Probe 0.4kg with 5m lead. 90° Probe 0.4kg with 5m lead.
Operating Temp’:	0° to 50°C. Operating -10° to 60°C Storage
Humidity:	0 to 90% R.H. operating
Case Rating:	IP65 with all connectors sealed with dust caps (supplied) or probe properly connected and dust caps on remaining two connectors.
Probe Rating:	100 meters water column.
Ordering Info:	
NEP160-1-05R	NEP160 with **NEP280** - 180° general purpose probe.
NEP160-2-05R	NEP160 with **NEP285** - 180° hi-temp probe.
NEP160-3-05R	NEP160 with **NEP260** - ISO7027 90° probe.
NEP160R	Display unit only.
	All probes are supplied with 5 meters of cable unless otherwise indicated at time of order.

DataBank
Handheld Datalogger

TURNER DESIGNS

DataBank Handheld Datalogger

The DataBank is a universal handheld meter, datalogger, and power supply. Designed to work with analog sensors from various manufacturers, the DataBank is easy to connect and use. Data, including GPS information, can be stored and downloaded to a PC. Sensor calibration is simplified through continuous sensor readings with results graphically displayed. Sensor power is provided directly from the DataBank, eliminating the need to connect external batteries. Designed with the customer in mind, the DataBank allows one-handed operation – even while wearing gloves.



DataBank Electrical Specifications

Selectable Sensor Parameters	Voltage: Software selectable 3 to 12 volts Current: 150 mA at 3V to 100 mA at 12V Warm-up Time: 0-25 seconds Gain: 1-4
Inputs	Input Selection: Switch; *Differential Voltage, Differential Current or Dual Current* Range: 0-5V or 0-25 mA Resolution: 12 bits Sampling Rate: 1000 Hz (bursts); groups of bursts re-averaged @ 30 Hz
Outputs	Two, Open Drain, up to 200 mA @ 15V max (Used primarily for gain selection)
Storage	Non-Volatile, 1280 Kb (9,999 records, 1 record = sensor reading, date, time and location)
Current Draw	Computer: <=45 mA (at full charge). Sleeping <20 uA LCD Backlight: Full power ~ 30 mA. Low Power ~ 15 mA
Battery	Type: NiMH rechargable, 4.8 volts, 4,000 mA/Hr. User-replaceable Life: Continuous up to 70 hours (dependant on sensor)
Charge Time	~3 hours (for a fully discharged battery; ambient @ 25 degrees C)
Serial Communications	RS-232
GPS Power	3.3 VDC @ up to 300 mA Note: While DataBank is off, GPS is self-powered

DataBank Physical Specifications

Size	Main body: 4.6"W x 3.2"H, x 3.4"D, Handle: 4.8" long Overall: 11"H (with handle, stain-relief and connector).
Weight	1.7 lb. (.76 kg) w/o GPS
Weatherproof	Case IP65, connector IP68, buttons IP64.

Highlights of the DataBank

- Stores up to 9,999 records and 16 calibrations
- Includes auto-gain function
- Enables unattended datalogging at intervals from 1 second to 4 days
- Simplifies sensor calibration
- Provides rugged, weather-proof design
- GPS-enabled
- Works with many analog sensors including Seapoint Sensors, WET Labs and Campbell Scientific

Ordering Information

INSTRUMENT	PART NUMBER
All instrument packages include rechargeable NiMH batteries, PC/Power interface cable, AC to DC charger supply, software & manual	
DataBank Handheld Datalogger For use with many analog sensors	2900-000
DataBank Handheld Datalogger with 2ft Cyclops Interface Cable	2900-002
DataBank Handheld Datalogger with 5m Cyclops Interface Cable	2900-005
DataBank Handheld Datalogger with 10m Cyclops Interface Cable	2900-010
DataBank Handheld Datalogger with 25m Cyclops Interface Cable	2900-025
DataBank Handheld Datalogger with 50m Cyclops Interface Cable	2900-050

DATABANK ACCESSORIES	PART NUMBER
Travel Case	142-2900
GPS Mounting Bracket for Garmin eTrex	2900-400
GPS Mounting Bracket for Garmin Geko	2900-401
External Power Option	2900-940
Car Charger	2900-151

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

Flexible Photometers for Lab or Field

YSI's new line of photometers includes the Model 9300 and 9500. Eliminate sample preservation by taking your portable, waterproof instruments to the field to perform the analysis on-site. All reagents are safe and easy to use.

The YSI 9500.

Selecting the desired test has never been easier. Simply navigate among the list of available tests on the screen of the instruments to choose your test and say "OK". The instrument will then walk you through the steps to complete the test. Simple. Convenient. Accurate.

Features (Model 9300 and 9500):

- Direct-reading concentrations with automatic set up
- Waterproof; IP-67 (floats)
- Large backlit graphic display
- Unique sample tube holder accommodates various diameters
- On-screen instructions
- Multiple languages (English, French, German, Spanish, Italian)
- 100+ test choices on the photometer display

Additional Features (Model 9500 only):

- Waterproof USB connection
- Power via USB port
- Internal Memory - 500 sample sets
- User-Selectable Options: test units, sample number, dilution factors

Advanced software built into the 9500 instrument remembers the most recent tests, making it even quicker to use the next time. Up to 500 test results are held in the 9500's memory along with a date and time stamp. Simply connect to a PC via USB and drag and drop the files to the PC. Software updates can also be completed through a simple USB connection. In addition, the 9500 allows up to 30 user-defined test methods allowing full flexibility in a range of test methods.

Applications include:

- Aquaculture
- Aquarium management
- Surface water
- Education
- Wastewater
- Watershed management

Specifications

Accuracy	±0.5% at 4% transmittance; ±0.005 at 0.3 AU
Resolution	0.001 AU
Operating Wavelengths	450, 500, 550, 575, 600 and 650 nm
Display	Graphic, backlit LCD with on-screen instructions
Power	3x AA batteries; the 9500 can also be powered via USB
Size (WxLxH)	146 x 275 x 75 mm (5.8 x 10.8 x 3 inches)
Weight	975 g (2 lbs)
Test Cells	Automatic adjustment from 12-20 mm diameter

Ordering

Test Kits	Range	Starter Packs (50 Tests)	Replacement Packs (250 Tests)
Alkalinity, Total (Alkaphot)	0-500 ($CaCO_3$)	YPM188	YAP188
Alkalinity-M (Alkaphot M)	0-500 ($CaCO_3$)	YPM250	YAP250
Alkalinity-P (Alkaphot P)	0-500 ($CaCO_3$)	YPM251	YAP251
Aluminum	0-0.5	YPM166	YAP166
Ammonia	0-1.0 (N)	YPM152	YAP152
Boron	0-2.5	YPM190	YAP190
Bromine	0-10.0	YPM060	YAP060
Calcium Hardness (Calcicol)	0-500 ($CaCO_3$)	YPM252	YAP252
Chloride (Chloridol)	0-50,000 (NaCl)	YPM268	YAP268
Chlorine DPD 1	0-5.0	YPM011	YAP011
Chlorine DPD 2	0-5.0	YPM021	YAP021
Chlorine DPD 1&3	0-5.0	YPM031	YAP031
Chlorine DPD 4	0-5.0	YPM041	YAP041
Chlorine HR (High Range)	0-250	YPM162	YAP162
Chlorine Dioxide (DPD)	0-4.0	YPM052	YAP052
Chlorine Dioxide LR (Low Range)	0-2.5	YPM064	YAP064
Chlorine Dioxide HR (High Range)	2.5-20	YPM065	YAP065
Chromium VI (Hexavalent)	0-1.0	YPM281	YAP281
Copper (Coppercol) (free, combined, total)	0-5.0	YPM186	YAP186
Copper (free)	0-5.0	N/A	YAP187
Color (includes turbidity)	10-500	YPM269	N/A
Cyanuric Acid	0-200	YPM087	YAP087
Fluoride	0-1.5	YPM179	YAP179
Hardness (Hardicol)	0-500 ($CaCO_3$)	YPM254	YAP254
Hydrazine	0-0.5	YPM103*	YAP103
Hydrogen Peroxide LR	0-2	YPM104	YAP104
Hydrogen Peroxide HR	0-100	YPM105	YAP105
Iron LR	0-1.0	YPM155	YAP155
Iron MR	0-5.0	YPM292	YAP292
Iron HR	0-10	YPM156	YAP156
Magnesium (Magnecol)	0-100	YPM193	YAP193
Manganese	0-0.03	YPM173	YAP173
Molybdate LR	0-20	YPM258	YAP258
Molybdate HR	0-100	YPM175	YAP175
Nickel	0-10	YPM284	YAP284
Nitrate	0-20 (N)	YPM163	YAP163
Nitrite (N)	0-0.5 (N)	YPM109	YAP109
Nitrite ($NaNo_2$)	0-1500 ($NaNo_2$)	YPM260	YAP260
Organophosphonate (OP)	0-20 (PO_4)	YPM262	YAP262
Ozone	0-2.0	YPM056	YAP056
pH (phenol red)	6.8-8.4	YPM130	YAP130
Phenol	0-5.0	YPM287	YAP287
Phosphate LR	0-4.0	YPM177	YAP177
Phosphate HR	0-100	YPM114	YAP114
Potassium	0-12	YPM189	YAP189
Silica	0-4.0	YPM181	YAP181
Silica HR	0-150	YPM290	YAP290
Sulphate	0-200	YPM154	YAP154
Sulphide	0-0.5	YPM168	YAP168
Sulphite	0-500 (Na_2SO_3)	YPM266	YAP266
Zinc	0-4.0	YPM148	YAP148

Item	Part Number	Description
9300	YPT9300	9300 photometer**
9500	YPT9500	9500 photometer***
285	YPT285	Hard-sided carrying case for the 9300
286	YPT286	Hard-sided carrying case for the 9500
804	YPT804	Color Standard Kit
283	YPT283	USB Power Supply for 9500
284	YPT284	USB Waterproof Cable for 9500

* Includes 30 tests ** Includes YPT285 *** Includes YPT286 and YPT284

SINGLE WAVELENGTH COLORIMETERS

1200 COLORIMETER SERIES

The new 1200 Series of single test, direct reading colorimeters incorporates design advances that enhance reliability, improve accuracy, and simplify the calibration process, all in a portable, hand-held package.

SPECIFICATIONS:

Instrument Type:	Single wavelength, direct-reading colorimeter
Readout:	3½digit LCD
Photometric Accuracy:	±0.001 Absorbance Unit
Detector:	Silicon Photodiode
Sample Chamber:	Accepts 25mm diameter flat-bottom, capped test tubes (included)
Light Source:	LED
Interface:	RS-232 serial interface
Power:	Alkaline 9-volt DC battery, 3.5 mm jack for optional AC adapter
Size (LxWxH):	15 x 8 x 5.5 cm; 6 x 3c x 2½inches

SINGLE TEST COLORIMETER KITS AVAILABLE:

Test Factor	*Order Code*	*Model*	*Range (ppm)*	*Detection Limit*	*Test Method (# of Reagents)*
Ammonia Nitrogen	**3680-01**	DC1200-NH	0–5.0	0.05	Nessler (2)
Bromine	**3672-01**	DC1200-BR	0–7.0	0.05	DPD Tablets (1)
Chlorine (Free & Total) SEE BELOW	**3670-01**	DC1200-CL	0–4.0	0.05	DPD Tablets (2)
Chlorine (Free & Total) SEE BELOW	**3670-01-LI**	DC1200-CL-LI	0–4.0	0.05	DPD Liquid (3)
Chlorine Dioxide	**3671-01**	DC1200-CLO	0–7.0	0.05	DPD with Glycine Solution (2)
Copper	**3673-01**	DC1200-CO	0–8.0	0.03	Diethyldithiocarbamate (1)
Fluoride	**3674-01**	DC1200-FL	0–2.0	0.028	Alizarin-Zirconyl (2)
Iron	**3681-01**	DC1200-FE	0–4.0	0.25	1–10 Phenanthroline (2)
Manganese	**3682-01**	DC1200-MN	0–0.9	0.01	PAN (3)
Molybdenum	**3676-01**	DC1200-MO	0–50	0.5	Thioglycolate (3)
Nitrate Nitrogen	**3677-01**	DC1200-NA	0–3.0	0.05	Cadmium Reduction (2)
Ozone	**3678-01**	DC1200-OZ	0–0.4	0.04	Indigo Blue (3)
Phosphate	**3679-01**	DC1200-PLR	0–3.0	0.07	Ascorbic Acid (2)
Sulfate	**3683-01**	DC1200-SU	0–100	1.0	Barium Chloride (1)

SMART Spectro™ Spectrophotometer

The **SMART Spectro** is a portable spectrophotometer that is easier to use and more accurate than anything in its price range. With automatic wavelength selection, pre-programmed tests, and superior performance - this is the best spectrophotometer for the money!

Over 80 pre-programmed tests included, and 25 user calibrations can be entered into the memory. The user can also customize sequences for frequently run tests.

Advanced Features:

- A wider wavelength range
- Menu-driven display
- Pre-programmed tests with 25 user tests
- Automatic wavelength selection
- Unique optical design system using a 1200 lines/mm grating
- Greater accuracy, higher resolution

All Ready to Go!

The SMART Spectro is supplie with 6 sample tubes, 2 samp cell holders, AC adapter, batt charger, instruction manual including test procedures, an quick-start guides.

Specifications:	
Wavelength Range:	350-1000 nm
Wavelength Accuracy:	±2 nm
Wavelength Resolution:	1 nm
Wavelength Bandwidth:	5 nm (max)
Photometric Range:	0-125%T, -0.1-2.5A
Photometric Accuracy:	±0.005A
Photometric Noice:	<0.001A at 0A,<0.002A at 2A
Photometric Drift:	±0.002A/hr @500 nm
Photometric Stray Light:	<0.5 %T
Dispersive Device:	Grating - based system
Optical Mount:	Modified Ebert
Grating:	1200 grooves/mm ruled grating
Light Source:	Quartz halogen
Bulb Life:	1000 hours minimum
Sample Chambers:	25 mm round cell, 10 mm square cuvette UDV, COD, flow-through (optional)
Detector:	Silicon photodiode
Temperature Range:	0-40°C
Modes	Conc., %T, ABS
Pre-Programmed Tests:	Yes
Wavelength Selection:	Automatic
User Tests:	Yes, up to 25 can be entered and edited
Datalogging:	Yes, RS-232
Diagnostics:	Yes
Power:	110/220 volt or battery pack (rechargeable)
Weight:	4.65 kgs (10.3 lbs)
Size (W x D x H):	35 cm x 28 cm x 17 cm

SMART Spectro Reagent Systems

Test Factor	Range ppm	Test Method (# of reagents)	# of Tests	Case Size*	Order Code
Alkalinity UDV†	0-200	UDV (1)	50	E	4318-H
Aluminum	0.00-0.30	Eriochrome Cyanine R (4)	50	C	3641-SC
Ammonia Nitrogen-LR (Fresh Water)	0.00-1.00	Salicylate (3)	25	A	3659-01-SC
Ammonia Nitrogen-LR (Salt Water)	0.00-1.00	Salicylate (3)	25	A	3659-01-SC
Ammonia Nitrogen HR	0.00-4.00	Nesslerization (2)	50	A	3642-SC
Benzotriazole	0.00-30.00	UV Oxidation/Dichromate	50	C	4047
Biquanide	0.00-70.00	Colorimetric	50	A	4044
Boron	0.00-0.80	Azomethine-H (2)	50	D	4868
Bromine LR	0.00-9.00	DPD Tablets (3)	100	A	3643-SC
Bromine UDV†	0.00-22.00	Unit Dose Vial (1)	50	E	4311-H
Cadmium	0.00-1.00	PAN (4)	50	E	4017
Calcium/Magnesium (Total) Hardness UDV	10-500	Unit Dose Vial (1)	50		4309-H
Carbohydrazide	0.000-0.9000	Iron Reduction (3)	100	E	4857
Chloride TesTab	0.0-30.0	Argentometric (1)	50	A	3693-SC
Chlorine	0.00-4.00	DPD Tablets (3)	100	A	3643-SC
Chlorine Free UDV†	0.00-10.00	DPD (1)	50	E	4311-H
Chlorine Liquid DPD	0.00-4.00	DPD (3)	144	A	4859
Chlorine Total UDV†	0.00-10.00	DPD (1)	50	E	4312-H
Chlorine Dioxide	0.00-7.00	DPD tablet/Glycine (2)	50	A	3644-SC
Chromium (Hexavalent)	0.00-1.00	Diphenylcarbohydrazide (1)	100	A	3645-SC
Chromium TesTab	0.00-1.00	Diphenylcarbohydrazide (1)	50	A	3697-SC
Chromium (Total, Hex & Trivalent)	0.00-1.00	Diphenylcarbohydrazide (5)	100	D	3698-SC
Cobalt	0.00-2.00	PAN (3)	50	D	4851
COD LR 0-150 with Mercury‡	5-150	Digestion (1)	25	D	0075-SC
COD LR 0-150 without Mercury‡	5-150	Digestion (1)	25	D	0072-SC
COD SR 0-1500 with Mercury‡	0-1500	Digestion (1)	25	D	0076-SC
COD SR 0-1500 without Mercury‡	0-1500	Digestion (1)	25	D	0073-SC

COD HR 0-15,000 with Mercury‡	0-15,000	Digestion (1)	25	D	0077-SC
COD HR 0-15,000 without Mercury‡	0-15,000	Digestion (1)	25	D	0074-SC
Color	0-1000	Platinum Cobalt (0)	¥	—	NA
Copper BCA - LR	0.00-3.50	Bicinchoninic Acid (1)	50	A	3640-SC
Copper Cuprizone	0.00-2.00	Cuprizone (2)	50	A	4023
Copper DDC	0.00-6.00	Diethyldithiocarbamate (1)	100	A	3646-SC
Copper UDV†	0.00-4.00	UDV, Bicinchoninic acid (1)	50	E	4314-H
Cyanide	0.00-0.50	Pyridine-Barbituric Acid (5)	50	C	3660-SC
Cyanuric Acid	5-200	Melamine (1)	100	C	3661-SC
Cyanuric Acid UDV†	5-150	Melamine, UDV (1)	50	E	4313-H
DEHA	0.000-0.700	Iron Reduction (3)	100	A	4857
Dissolved Oxygen (DO)	0.0-12.0	Winkler Colorimetric (3)	100	A	3688-SC
Erythorbic Acid	0.00-3.00	Iron Reduction (3)	100	A	4857
Fluoride	0.00-2.00	SPADNS (2)	50	B	3647-01-SC
Hardness (total) UDV	10-500	UDV	50	E	4309-H
Hydrazine	0.00-0.75	p-dimethylaminobenzaldehyde (2)	25	A	3656-SC
Hydrogen Peroxide LR	0.00-1.50	DPD Tablets (2)	100	A	3662-SC
Hydrogen Peroxide HR	0.00-60.00	DPD	100	B	4045
Hydrogen Peroxide Shock	0.00-225.00	DPD	100	B	4045
Hydroquinone	0.00-1.80	Iron Reduction (3)	100	A	4857
Iodine	0.00-14.00	DPD Tablets (2)	100	A	3643-SC
Iron	0.00-6.00	Bipyridyl (2)	50	A	3648-SC
Iron UDV†	0.00-10.00	Bipyridyl UDV (1)	50	E	4315-H
Iron Phenanthroline	0.00-4.50	1,10 Phenanthroline (2)	50	A	3668-SC
Lead	0.00-5.00	PAR (5)	50	D	4031
Manganese LR	0.00-0.70	PAN (3)	50	B	3658-SC
Manganese HR	0.0-15.0	Periodate (2)	50	A	3669-SC
Mercury	0.00-1.50	TMK (3)	50	D	4861
Methylethylketoxime	0.00-3.00	Iron Reduction (3)	100	A	4857
Molybdenum HR	0.0-15.0	Thioglycolate (3)	50	B	3699-02-SC
Nickel	0.00-8.00	Dimethylglyoxime (6)	50	D	3663-SC
Nitrate Nitrogen LR	0.00-3.00	Cadmium Reduction (2)	20	A	3649-SC
Nitrate TesTab	0.0-60.0	Zinc Reduction (1)	50	A	3689-SC
Nitrite Nitrogen LR	0.00-0.80	Diazotization (2)	20	A	3650-SC
Nitrite TesTab	0.00-1.25	Diazotization (1)	50	A	3886-SC
Nitrogen, Total‡	0.00-25.00	Chromotropic Acid and Perfulfate Digestion	25	D	4026
Ozone LR	0.00-0.40	Indigo Trisulfonate (3)	100	D	3651-SC
Ozone HR	0.00-2.50	Indigo Trisulfonate (3)	20	D	3651-SC

pH CPR (Chlorphenol Red)	5.0-7.0	Colorimetric (3)	100	B	3700-SC
pH PR (Phenol Red)	6.6-8.4	Colorimetric (3)	100	B	3700-SC
pH TB (Thymol Blue)	8.0-9.5	Colorimetric (3)	100	B	3700-SC
Phenol	0.00-6.00	4-Aminoantipyrine (3)	50	B	3652-SC
Phosphate LR‡	0.00-3.00	Ascorbic Acid Reduction (2)	50	A	3653-SC
Phosphate HR‡	0.00-70.0	Vanadomolybdophosphoric Acid (1)	50	A	3655-SC
Phosphorus, Total LR	0.00-3.50	Ascorbic Acid and Persulfate Digestion	25	D	4024
Phosphorus, Total HR	0.00-100.00	Molybdoranadate and Persulfate Digestion	25	D	4025
Potassium	0.0-10.0	Tetraphenylboron (2)	100	A	3639-SC
Silica LR	0.00-2.50	Heteropoly Blue (4)	50	A	3664-SC
Silica HR	0-50	Silicomolybdate (3)	50	A	3687-SC
Sulfate	5.00-100.00	Barium Chloride (1)	50	A	3665-SC
Sulfide LR	0.00-1.00	Methylene Blue (3)	50	B	3654-01-SC
Surfactants	0.00-8.00	Bromphenol Blue (3)	50	D	4876
Tannin	0.00-10.00	Tungstomolybdophosphoric Acid (2)	50	B	3666-SC
Tolytrizole	0.00-30.00	UV Oxidation/Dichromate	50	C	4047
Turbidity	0-400	Absorptimetric (0)	¥	—	NA
Zinc LR	0.00-3.00	Zincon (6)	50	D	3667-SC

†Requires Accessory Package Code Number 1961 or 1962.

‡Requires Heater Block.

***Case Type:**
A: 7 x 7 x 10 cm
B: 14.5 x 6.5 x 13 cm
C: 14.5 x 9.5 x 13.5 cm
D: Stand-alone cases. Will not fit into optional field carrying cases.
E: 13 x 7 x 12.5 cm

ProODO

Digital Optical Dissolved Oxygen Meter

YSI ODO * technology reduces the time required calibrating and maintaining sensors while utilizing a user replaceable sensing element that requires approximately an annual replacement. There are no electrodes to clean or solutions to change. Based on usage, calibrations can be stable for up to one year and are stored in each sensor.

- Expanded DO range of 0-500% with a response time of T90 in approximately 25 seconds
- Non-consumptive luminescent method eliminates stirring
- Easy to read graphic, backlit display and keypad for use in any lighting condition
- Truly fi eld-worthy, impact resistant, IP-67 waterproof case and connectors; rubber over molded, non-slip case, for extra durability and grip
- User-replaceable cables in lengths of 1 to 100-meters; cable management kit included with 4- through 30-meter cables
- Pro Comm II allows USB connectivity for use with Data Manager software and powers the instrument
- Stores 5000 data sets (sensor data, date, time, site and user defi ned information)
- **Multiple languages include English, Spanish, French, Italian, Norwegian, Portuguese and German. Asian language support in the future.**
- **3-year instrument warranty; 2-year cable and probe warranty**

YSI Optical BOD Probe

ProOBOD™ - Use i in the lab with the ProODO®

- Smart sensor retains calib **s calibration in the probe**
- User-replaceable, low-ma **w-maintenance sensor** with +1-year life
- 2-year warranty; reliable **liable and serviceable, design** reduces cost-of-ownersh **ership and reduces down-time**
- Probe body tapered to fi **to fit into a standard 300 mL** BOD bottle; internationa **ional version also available**
- Extremely quiet operatio **ration**
- No warm-up time require **equired**
- Self-stirring to provide re **de representative sample** and improve response ti **se times**

Specifications

ProODO System Specifications (instrument with cable and probe)

Dissolved Oxygen (% saturation)	Sensor Type	Optical (dynamic luminescence quenching lifetime detection)
	Range	0 to 500% air saturation
	Accuracy	0 to 200% air saturation, ± 1% of the reading or ± 1% air saturation, whichever is greater; 200 to 500% air saturation, ± 15% of the reading
	Resolution	0.1% air saturation
Dissolved Oxygen (mg/L)	Sensor Type	Optical (dynamic luminescence quenching lifetime detection)
	Range	0 to 50 mg/L
	Accuracy	0 to 20 mg/L, ± 0.1 mg/L or ± 1% of reading, whichever is greater; 20 to 50 mg/L, ± 15% of the reading
	Resolution	0.01 or 0.1 mg/L (auto-scaling)
Temperature (°C, °F, °K)	Range	-5 to 70°C
	Accuracy	± 0.2°C
	Resolution	0.1°C
Barometer (mmHg, inHg, mBar, Psi, KPa)	Range	375 to 825 mmHg
	Accuracy	± 1.5 mmHg from 0 to 50°C
	Resolution	0.1 mmHg

ProODO Additional Specifications

Storage Temperature	-20 to 70°C
Size	8.3 cm width x 21.6 cm length x 2.3 cm depth (3.25 in x 8.5 in x 2.25 in)
Weight with batteries	475 grams (1.05 lbs)
Probe Dimensions	19 cm length (7.5 in); 2.4 cm diameter (0.95 in)
Power	2 alkaline C-cells; approximately 80 hours - ambient conditions in manual sampling mode
Cable Lengths*	1- 4- 10- 20- 30- 40- 50- 60- and 100-m; (3.3, 13.1, 32.8, 65.6, 98, 131, 164, 197 and 328 ft)
Connectors	MS (military spec) waterproof with bayonet lock
Warranty	3-year instrument; 2-year cable and probe; 1-year sensor cap
Salinity Input Range	0-70 ppt; manual (automatically compensates for manual input value)
Data Memory	5000 data sets (sensor data, date, time, site and user defined information)
Flow Dependence	None
Typical Response Time	90% in 25 seconds; 95% in 45 seconds
Calibration	DO - one point or two point with a zero % value; barometer - one point
Languages	English, Spanish, German, French, Italian, Norwegian, Portuguese; Asian language support in the future
Certifications	RoHS, CE, WEEE, C-Tick, VCCI, IP-67, 1-meter drop test, Assembled in USA
Connectivity	USB 2.0; communications saddle and USB cable included
Data Management	Data Manager desktop software included; 100 user defined folders and site names
User ID	Optional User ID for data security
Measurement/ Logging Modes	Automatic and Manual sampling modes/Continuous and Interval logging modes
GLP Compliant	Yes
Probe/Sensor Materials	The following materials may come into contact with the sampling environment: Xenoy® PBT Polycarbonate blend, Noryl, Stainless Steel, Titanium, Polyurethane, Santoprene, Acrylic, Polystyrene

* special order cables up to 100-meters in 10-meter increments

YSI ProOBOD Probe Specifications

Accuracy	mg/L	0-20 mg/L, ±0.1 mg/L or ±1% reading, whichever greater; 20-50 mg/L, ±15% reading
	% air	0-200%, ±1% reading or ±1%, whichever greater; 200-500%, ±15% reading
	temperature	±0.2° C
Range	mg/L	0-50 mg/L
	% air	0-500% air saturation
	temperature	Ambient (10 to +40° C); Compensation (-5 to +50° C)
Resolution	mg/L	0.01
	% air	0.1%
	temperature	0.1° C
Warranty	2-years; 1-year sensor cap	
Cable Length	3-meters (6 feet)	
Power	External 110-230 VAC power supply with DC input to sensor	
Sensor Type	Optical; dynamic luminescence quenching lifetime detection	
Typical Response Time	95% in 22 seconds with stirring; 95% in 40 seconds without stirring	
Certifications	RoHS, CE, WEEE, IP-65, Assembled in USA	

603069 belt clip

603062 cable management kit

603075 soft-sided carrying case with ProODO, cable, and accessories

YSI.com/ProODO

YSI.com/ProOBOD

ProODO™

Handheld Optical Dissolved Oxygen Meter

The new ProODO ™ provides traditional YSI quality in a handheld dissolved oxygen instrument with luminescent optical dissolved oxygen (DO) technology. The ProODO utilizes "smart" digital sensor technology which stores calibration data within the sensor. This allows probes to be placed on any ProODO instrument without re-calibration.

YSI ODO technology reduces the time required calibrating and maintaining sensors while utilizing a user replaceable sensing element that requires approximately an annual replacement. There are no electrodes to clean or solutions to change. Based on usage, calibrations can be stable for up to one year and are stored in each sensor.

Optical technology also increases DO accuracy and eliminates probe fouling by common gases such as hydrogen sulfide.

The ProODO is a digital signal instrument. Any ProODO cable can be connected and used on any ProODO instrument for the field or in a lab BOD bottle. The luminescent optical probes hold the calibration information internally.

- **Expanded DO range of 0-500% with a response time of T90 in approximately 25 seconds**
- **Non-consumptive luminescent method eliminates stirring**
- **Easy to read graphic, backlit display and keypad for use in any lighting condition**
- ***Designed to fit in standard 300 mL BOD bottles.* An external stir plate may be required to ensure a representative sample.**
- **Truly field-worthy, impact resistant, IP-67 waterproof case and connectors; rubber over molded, non-slip case, for extra durability and grip**
- **User-replaceable cables in lengths of 1 to 100-meters; cable management kit included with 4-meter and longer cables**
- **USB connection allows interaction with powerful desktop Data Manager software**
- **Stores 2000 data sets (sensor data, date, time, site and user defined information)**
- **Multiple languages include English, Spanish, French, Italian, Norwegian, Portuguese and German. Asian language support in the future.**
- **3-year instrument warranty; 2-year cable and probe warranty**

ODO™ Optical DO

ProODO *System* Specifications (instrument with cable and probe)

Dissolved Oxygen (% saturation)	Sensor Type	Optical (dynamic luminescence quenching lifetime detection)
	Range	0 to 500% air saturation
	Accuracy	0 to 200% air saturation, ± 1% of the reading or ± 1% air saturation, whichever is greater; 200 to 500% air saturation, ± 15% of the reading
	Resolution	0.1% air saturation
Dissolved Oxygen (mg/L)	Sensor Type	Optical (dynamic luminescence quenching lifetime detection)
	Range	0 to 50 mg/L
	Accuracy	0 to 20 mg/L, ± 0.1 mg/L or ± 1% of reading, whichever is greater; 20 to 50 mg/L, ± 15% of the reading
	Resolution	0.01 or 0.1 mg/L (auto-scaling)
Temperature (°C, °F, °K)	Range	-5 to 70°C
	Accuracy	± 0.2°C
	Resolution	0.01°C
Barometer (mmHg, inHg, mBar, Psi, KPa)	Range	375 to 825 mmHg
	Accuracy	± 1.5 mmHg from 0 to 50°C
	Resolution	0.1 mmHg

ProODO Additional Specifications

Storage Temperature	-20 to 70°C
Size	8.3 cm width x 21.6 cm length x 2.3 cm depth (3.25 in x 8.5 in x 2.25 in)
Weight with batteries	475 grams (1.05 lbs)
Probe Dimensions	19 cm length (7.5 in); 2.4 cm diameter (0.95 in)
Power	2 alkaline C-cells; approximately 80 hours - ambient conditions in manual sampling mode
Cable Lengths*	1- 4- 10- 20- 30- 40- 50- 60- and 100-m; (3.3, 13.1, 32.8, 65.6, 98, 131, 164, 197 and 328 ft)
Connectors	MS (military spec) waterproof with bayonet lock
Warranty	3-year instrument; 2-year cable and probe; 1-year sensor cap
Salinity Input Range	0-70 ppt; manual (automatically compensates for manual input value)
Data Memory	2000 data sets (sensor data, date, time, site and user defined information)
Flow Dependence	None
Typical Response Time	90% in 25 seconds; 95% in 45 seconds
Calibration	DO - one point or two point with a zero % value; barometer - one point
Languages	English, Spanish, German, French, Italian, Norwegian, Portuguese; Asian language support in the future
Certifications	RoHS, CE, WEEE, C-Tick, VCCI, IP-67, 1-meter drop test, Assembled in USA
Connectivity	USB 2.0; communications saddle and USB cable included
Data Management	Data Manager desktop software included; 100 user defined folders and site names
User ID	Optional User ID for data security
Measurement/Logging Modes	Automatic and Manual sampling modes/Continuous and Interval logging modes
GLP Compliant	Yes
Probe/Sensor Materials	The following materials may come into contact with the sampling environment: Xenoy® PBT Polycarbonate blend, Noryl, Stainless Steel, Titanium, Polyurethane, Santoprene, Acrylic, Polystyrene

ProODO Ordering Information (order items separately)

626281	ProODO Handheld instrument
626320	Replacement sensing element (included with initial probe purchase)
626250-1	1-m probe/cable for DO/temp
626250-4	4-m probe/cable for DO/temp (includes cable management kit)
626250-10	10-m probe/cable for DO/temp (includes cable management kit)
626250-20	20-m probe/cable for DO/temp (includes cable management kit)
626250-30	30-m probe/cable for DO/temp (includes cable management kit)
626250-40	40-m probe/cable for DO/temp (includes cable management kit)
626250-50	50-m probe/cable for DO/temp (includes cable management kit)
626250-60	60-m probe/cable for DO/temp (includes cable management kit)
626250-100	100-m probe/cable for DO/temp (includes cable management kit)

603069 belt clip

603062 cable management kit

Accessories Ordering Information (visit ysi.com/accessories)

603075	Soft-sided carrying case
603074	Hard-sided carrying case
603069	Belt clip to attach instrument to belt
063517	Ultra clamp (attach to instrument to secure it to a desk, boat, etc)
063507	Small tripod (attach to instrument to sit on any flat surface)
603062	Cable management kit (included with 4- through 100-m cables)
605978	Cable weight, 4.9 oz, attach to stainless steel probe guard

603075 soft-sided carrying case with ProODO, cable, and accessories

* Special order cable lengths up to 100-meters in 10-meter increments available.

YSI ProfessionalPlus

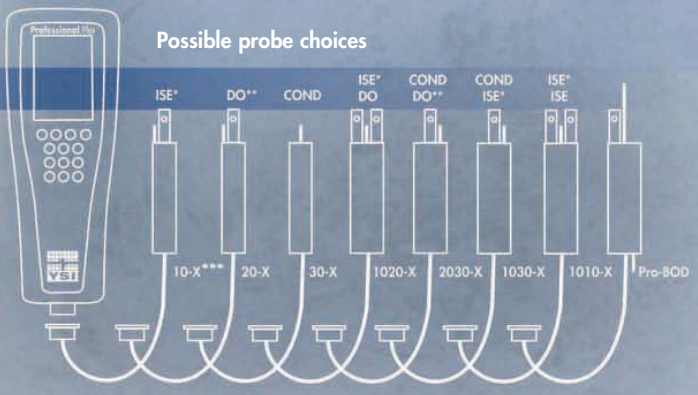
The rugged design and field-worthiness of the Professional Plus instrument allows you to perform your job with confidence even in the harshest field conditions and with the

- DO, pH, Conductivity, ORP, Ammonium, Nitrate, Chloride, Salinity, Total Dissolved Solids, Barometric Pressure
- 2,000 data-set memory with GLP event logging
- Interval or single-event logging capability
- Rubber, over-molded IP-67 water proof case
- 3-year instrument warranty; 2-year cable warranty
- User- upgradeable software via USB
- Backlit display AND keypad
- Graphic display with detailed Help
- Rugged cables, connectors, and probes

The **YSI Professional Plus** accommodates any combination of Pro Series probe, cable, and accessory. This compact handheld includes multiple languages, detailed GLP data, on-screen Help functionality, auto-buffer recognition, mil-spec connectors, re-cal prompts, auto-stable and security passwords to help make your job easier.

Finally, a professional instrument for a true professional.

Possible probe choices

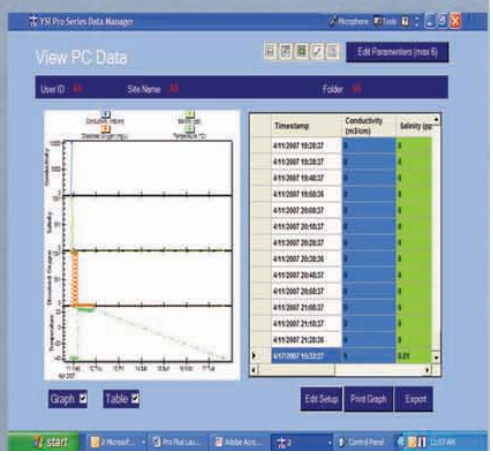


* Choice of ISE; pH, ORP, pH/ORP (not recommended on the 1010-X cable)
Choice of ISE; Ammonium, Nitrate, or Chloride for fresh water only
** Choice of DO; Galvanic, Polarographic
*** Lab-grade pH and ORP cable/probe options available
X= Choice of cable length: 1, 4, 10, 20, 30-meter all (up to 100-meters on 20-X only)

Connect from field to lab probes in seconds

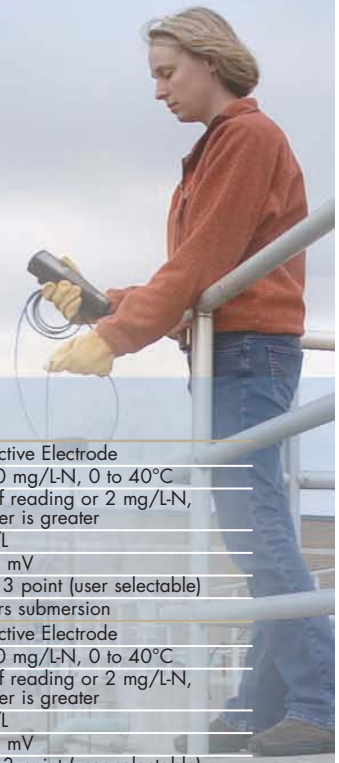
Data Manager Software

- Easy-to-use software to manage all your data, set up instruments, or conduct real-time studies
- View graphical and tabular data
- USB connection also powers the instrument



lowest overall cost of ownership. Interchangeable probes and cables reduce down-time and keeps the Pro Plus ready whenever and wherever you are - field or lab.

if complexity is the problem
ease of use is the solution
productivity is the impact



SPECIFICATIONS

(SYSTEM W/4-METER CABLE AND PROBES)

Dissolved Oxygen (%)	Sensor Type	Polarographic or Galvanic
	Range	0 to 500%
	Accuracy	0 to 200% ± 2% of reading or 2% air saturation, whichever is greater 200% – 500% ± 6% of reading
	Resolution	1% or 0.1% air saturation (user selectable)
	Calibration	1 point and zero
Dissolved Oxygen (mg/L)	Sensor Type	Polarographic or Galvanic
	Range	0 to 50 mg/L
	Accuracy	0 to 20 mg/L (±2% of the reading or 0.2 mg/L, whichever is greater) 20 to 50 mg/L (±6% of the reading)
	Resolution	0.1 or 0.01 mg/L (user selectable); 0.1% air saturation
	Calibration	1 point and zero
Temperature (Field rugged cable)	Range	–5 to 70°C
	Accuracy	±0.2°C
	Resolution	0.1°C
	Units	°C, °F, K
Temperature (Lab-grade)*	Range	–5 to 70°C
	Accuracy	±0.35°C
	Resolution	0.1°C
	Units	°C, °F, K
	Depth	4-meters submersion
Conductivity**	Sensor Type	Four electrode cell
	Range	0 to 200 mS/cm
	Accuracy	±0.5% of reading or 0.001 mS/cm, whichever is greater (4-m cable) ±1% of reading or 0.001 mS/cm, whichever is greater (20-m cable)
	Resolution	0.001 mS/cm to 0.1 mS/cm (range dependent)
	Units	µS, mS
	Calibration	1 point
Salinity	Sensor Type	Calculated from conductivity and temperature
	Range	0 to 70 ppt
	Accuracy	±1.0% of reading or 0.1 ppt, whichever is greater
	Resolution	0.01 ppt
	Units	ppt, PSU
	Calibration	1 point
pH	Sensor Type	Glass Combination Electrode
	Range	0 to 14 units
	Accuracy	±0.2 units
	Resolution	0.01 units
	Units	mV, pH units
	Calibration	1, 2, 3, 4, 5, or 6 point (user selec table); US, NIST or Custom Buffers
ORP	Sensor Type	Platinum button
	Range	–1999 to +1999 mV
	Accuracy	+/-20 mV in redox standards
	Resolution	0.1 mV
	Units	mV
	Calibration	1 point

Ammonium***	Sensor Type	Ion Selective Electrode
	Range	0 to 200 mg/L-N, 0 to 40°C
	Accuracy	±10% of reading or 2 mg/L-N, whichever is greater
	Resolution	0.1 mg/L
	Units	mg/L-N, mV
	Calibration	1, 2, or 3 point (user selectable)
	Depth	17-meters submersion
Nitrate***	Sensor Type	Ion Selective Electrode
	Range	0 to 200 mg/L-N, 0 to 40°C
	Accuracy	±10% of reading or 2 mg/L-N, whichever is greater
	Resolution	0.1 mg/L
	Units	mg/L-N, mV
	Calibration	1, 2, or 3 point (user selectable)
	Depth	17-meters submersion
Chloride***	Sensor Type	Ion Selective Electrode
	Range	0 to 1000 mg/L, 0 to 40°C
	Accuracy	± 15% of reading or 5 mg/L, whichever is greater
	Resolution	0.1 mg/L
	Units	mg/L-Cl-, mV
	Calibration	1, 2, or 3 point (user selectable)
	Depth	17-meters submersion
Total Dissolved Solids (TDS)	Sensor Type	Calculated from conductivity and temperature
	Range	0 to 100 g/L Cal constant range 0.30 to 1.00 (0.64 default)
	Resolution	0.001, 0.01, 0.1g/L
	Units	kg/L, g/L
Barometer	Sensor Type	Piezoresistive
	Range	375 to 825 mmHg
	Accuracy	±3 mmHg within ±15°C from calibration point
	Resolution	0.1 mmHg
	Units	mmHg, inHg, mbar, psi, kPa, ATM
	Calibration	1 point

(INSTRUMENT ONLY AT AMBIENT TEMPERATURE)

pH	Range	-2.60 to 16.60
	Accuracy	+/-0.1 mV (0.01 pH units)
	Resolution	0.1 mV (0.01 pH units)
ORP	Range	-1999 to +1999 mV
	Accuracy	+/-0.5 mV
	Resolution	0.01 mV
Conductivity	Range	0.0 to 200 mS/cm
	Accuracy	+/-0.3% FS +/-1 digit for each range
	Resolution	0.0001 mS/cm or 0.1 uS/cm to 0.1 mS/cm (range dependent)
Dissolved Oxygen	Range	0.00 to 90 mg/L; 0 to 550%
	Accuracy	+/-0.2% FS (550% air saturation) +/- 1 digit (with 1.25 PE membrane at 10°C)
	Resolution	0.01 mg/L; 0.1% air saturation
Temperature	Range	-10 to 100.00C
	Accuracy	+/-0.2% FS (550% air saturation) +/- 1 digit (with 1.25 PE membrane at 10°C)
	Resolution	0.1C
	Units	C, F, K

* Lab-grade field cables include 605107, -108, -109, 605177, -178, -179
** Derived parameters can include resistivity, salinity, specific conductance, and total dissolved solids
*** ISE sensors for freshwater only

Aqua Fluor ™

Handheld Fluorometer/Turbidimeter

TURNER DESIGNS

*Aqua*Fluor™ Handheld Fluorometer/Turbidimeter

The *Aqua*Fluor™ is a lightweight, inexpensive, handheld fluorometer/turbidimeter ideal for field use. Its small size and durability make the *Aqua*Fluor™ perfect for the user who needs quick measurements away from the laboratory. Dual-channel capability allows users to measure fluorescence and turbidity in one sample.

While small in size, performance has not been compromised. The *Aqua*Fluor™ brings a new level of simplicity and economy to Turner Designs' line of fluorescence-based instrumentation.

Available Channels

The *Aqua*Fluor™ can be configured with one or two of the following channels:

- Turbidity
- *In Vivo* Chlorophyll *a*
- Extracted Chlorophyll *a*
- Blue Green Algae - Phycocyanin
- Blue Green Algae - Phycoerythrin
- Fluorescein Dye
- Rhodamine Dye
- Ammonium
- CDOM
- Optical Brighteners for Wastewater Treatment
- PTSA

Contact Us for Custom Optical Kits

Highlights of the AquaFluor™

- Dual channels allow for quick toggling between two applications
- Small size easily fits in shirt or jacket pocket
- Dustproof and watertight for field use, it even floats!
- Single-point plus blank calibration
- 12 bit resolution
- Operates using AAA batteries for >1,000 measurements per set
- 5 second warm up
- Low maintenance field fluorometer

Optional Accessories

- Internal Data Logging stores up to 1,000 points of data
- Adjustable Solid Secondary Standard provides Quick and Easy Checks of Calibration, Stability and Performance.

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

Aqua Fluor ™

Handheld Fluorometer/Turbidimeter

TURNER DESIGNS

Application	Minimum Detection Limit	Linear Range
In Vivo Chlorophyll *a*	0.3 µg/L	0 - 300 µg/L
Extracted Chlorophyll *a**	0.5 µg/L	0 - 300 µg/L
Ammonium*	0.1 µM	0 - 100 µM
CDOM	0.1 ppb	0 - 1000 ppb
Cyanobacteria	150 cells/mL	0 - 150,000 cells/mL
Optical Brighteners	0.5 ppm	0-30,000 ppm
Fluorescein Dye	0.4 ppb	0 - 400 ppb
Rhodamine Dye	0.4 ppb	0 - 400 ppb
Turbidity	0.5 NTU	0 - 1000 NTU
PTSA	<1 ppb	0 - 1000 ppb

*Reagents and Reaction Time Required

*Aqua*Fluor™ Physical Specifications	
Weight in Air	13.9 oz; 0.4 kg
Size	1.75" x 3.5" x 7.25"; 4.45 cm x 8.9 cm x 18.4 cm
Warm-up Time	5 seconds
Case	IP 67 standard; dustproof/waterproof
Temperature	41-104°F; 5-40°C

*Aqua*Fluor™ Electrical Specifications	
Power	4 AAA batteries
Detector	Photodiode 300nm-1,000 nm capable

Ordering Information

INSTRUMENT	PART NUMBER
*Aqua*Fluor™ Handheld Fluorometer/Turbidimeter	8000-010

ACCESSORIES	PART NUMBER
Internal Data Logging	8000-920
Adjustable Solid Secondary Standard*	8000-952
Adjustable Solid Secondary Standard**	8000-951
12mm Test Tube Adapter***	8000-932
Minicell Adapter	8000-936
12x75 mm Round Glass Test Tubes (12 ea)***	10-029A
10x10 mm Square Polystyrene Cuvette (100 ea)****	7000-957
10x10 mm Square Methacrylate Cuvette (100 ea)*****	7000-959
Minicells (200 µL capacity) (1000 ea.)	7000-950

AVAILABLE CHANNELS	PART NUMBER
Turbidity	8000-408
Chlorophyll *a in vivo*	8000-406
Chlorophyll *a* Extracted	8000-407
Blue Green Algae - Phycocyanin	8000-412
Blue Green Algae - Phycoerythrin	8000-411
Fluorescein Dye	8000-405
Rhodamine Dye	8000-409
Ammonium	8000-402
CDOM	8000-401
Optical Brighteners for Wastewater Treatment	8000-403
PTSA	8000-400

Contact Us for Custom Optics

*For use with chlorophyll *a*, phycoerythrin and rhodamine channels only
**For use with fluorescein and phycocyanin channels only
***Required for use with extracted chlorophyll
****Recommended for use with turbidity
*****Required for use with UV (<400nm)

Contact Us

Toll-Free : 1.877.316.8049
Phone : 408.749.0994
Fax : 408.749.0998

Email : sales@turnerdesigns.com
Web : www.turnerdesigns.com

Address:
845 West Maude Avenue
Sunnyvale, CA 94085

Reliable Instruments for an Unreliable World

S-0033 Rev. I

HOSKIN SCIENTIFIC

Trilogy

Laboratory Fluorometer

TURNER DESIGNS

Trilogy Laboratory Fluorometer

The Trilogy Laboratory Fluorometer is a compact laboratory instrument for making fluorescence, absorbance and turbidity measurements using the appropriate snap-in Application Module. Trilogy provides you with excellent sensitivity and measurement range. The all solid-state design ensures you will make reliable and repeatable readings.

Fluorescence modules are available for chlorophyll *a*, (extractive acidification and non-acidification plus *in vivo*), rhodamine and fluorescein dye, cyanobacteria (phycocyanin and phycoerythrin pigments), CDOM, optical brighteners and ammonium. For extracted chlorophyll measurements using EPA 445, Trilogy automatically calculates the concentration using the filtered and solvent volumes. The Turbidity Module uses an IR LED with a wavelength of 860 nm to meet ISO 7027 requirements for Turbidity water quality measurements.

Snap-In Application Modules

Snap-in modules enable you to select the applications you need today while being able to easily add capabilities in the future

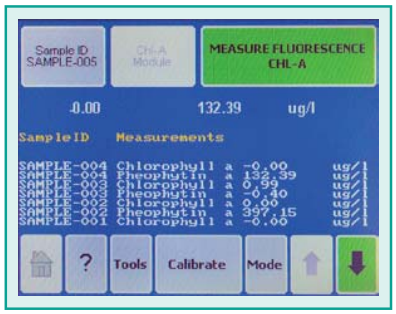
Available Modules

- Turbidity
- Absorbance
  - Phosphate
  - Nitrate
  - Silicate
- Chlorophyll *a*
- Blue Green Algae - Phycocyanin
- Blue Green Algae - Phycoerythrin
- Rhodamine Dye
- Fluorescein Dye
- Ammonium
- CDOM
- Histamine
- Oil
- Optical Brighteners for Wastewater Treatment

Custom Modules Also Available

Features of the Trilogy

- Multifunctional, Compact and Modern Design
- Sample Adaptor accommodates 10 x 10 mm square plastic cuvettes, 12 x 75 mm round tubes and 12 x35 mm round vials
- Snap-in Modules Provide Flexibility



Touchscreen Highlights

- Intuitive Color Touch Screen User Interface
- Store Up to 18 Named One to Five Point Calibrations
- Blank Reads and Automatically Subtracts in Direct Concentration Mode

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

Trilogy

Laboratory Fluorometer

TURNER DESIGNS

Fluorescence Module Performance

APPLICATION	MINIMUM DETECTION LIMIT	LINEAR RANGE
Chlorophyll *a*	0.025 µg/L	0-300 µg/L
Phycoerythrin	150 cells/ml	0-150,000 cells/ml
Phycocyanin	150 cells/ml	0-150,000 cells/ml
Rhodamine WT	0.01 ppb	0-500 ppb
Fluorescein	0.01 ppb	0-500 ppb
Ammonium	0.1 µM	0-100 µM
CDOM	0.1 ppb	0-1,000 ppb Quinine Sulfate
Crude OIl	0.2 ppb	0-2,000 ppb Quinine Sulfate
Refined Oil	0.25 ppb	0-6,000 ppb Napthalene
Optical Brighteners	1 ppb	0-10,000 ppb Quinine Sulfate

Absorbance Module Performance

APPLICATION	MINIMUM DETECTION LIMIT	LINEAR RANGE
Nitrate	0.04 mg/L of total inorganic N	0-14 mg/L of total inorganic N
Silicate	3 µg/L of total inorganic Si	0-3,000 µg/L of total inorganic Si
Phosphate	1 µg/L of total inorganic P	0-930 µg/L of total inorganic P

Turbidity Module Performance

APPLICATION	MINIMUM DETECTION LIMIT	LINEAR RANGE
Turbidity	0.05 NTU	0-1,000 NTU

Trilogy Physical Specifications

Readout	Direct Concentration (µg/l, ppb, etc.) or Raw Fluorescence
Dimensions (D x W x H)	12.92" x 10.44" x 8.42" (32.82 cm x 26.52 cm x 21.39 cm)
Weight	8.1 lbs (3.65 kg)
Operating Temperature	60 - 105˚ F (15 - 40˚C)

Trilogy Electrical Specifications

Light Source & Detector	Light Emitting Diode and Photodiode
Data Output	100% ASCII format through a 9 pin RS-232 serial cable at 9600 baud
PC Operating System (optional if connected to PC)	Window 98 or later
Power	100 to 240VAC Universal Power Supply included, Output 12 VDC 0.84A Max

Ordering Information

INSTRUMENT	PART NUMBER
Trilogy Laboratory Fluorometer	7200-000

FLUORESCENCE MODULES	PART NUMBER
Chlorophyll *a* Acidification	7200-040
Chlorophyll Non-Acidification	7200-046
Chlorophyll *a in-vivo*	7200-043
Rhodamine/Phycoerythrin	7200-042
Phycocyanin	7200-044
Fluorescein	7200-048
CDOM/Ammonium	7200-041
Histamine	7200-049
Short Oil	7200-062
Crude Oil	7200-063
Optical Brighteners for Wastewater Treatment	7200-047

TURBIDITY MODULE	PART NUMBER
Turbidity	7200-060

ABSORBANCE MODULES	PART NUMBER
Phosphate Kit	7200-070
Silicate Kit	7200-072
Nitrate Kit	7200-074
Absorbance (requires filter paddle)	7200-050
560/10 nm Filter Paddle	7200-051
600/10 nm Filter Paddle	7200-052
750/10 nm Filter Paddle	7200-053

Contact Us

Toll-Free : 1.877.316.8049
Phone : 408.749.0994
Fax : 408.749.0998
Email : sales@turnerdesigns.com
Web : www.turnerdesigns.com
Address:
845 West Maude Avenue
Sunnyvale, CA 94085

Reliable Instruments for an Unreliable World

S-0068 Rev. M

HOSKIN SCIENTIFIC

10-AU
Field Fluorometer

TURNER DESIGNS

10AU Field Fluorometer

The 10AU Field Fluorometer is a rugged, field-portable instrument that can be set up for continuous-flow monitoring or discrete sample analyses. Measurements are extremely stable with stability measured in months or weeks as opposed to days or hours. Watertight filter paddles enable quick change of excitation and emission filters so a variety of compounds can be easily measured on-site.

Available Optical Kits

Optical kits with appropriate filters and lamps are available for a wide range of applications and can be easily installed in the field or lab. Individual filters and lamps can also be purchased for customized applications.

Available Optical Kits

- Chlorophyll *a* - Extracted and/or *In Vivo*
- Blue Green Algae - Phycocyanin (freshwater)
- Blue Green Algae - Phycoerythrin (marine)
- Rhodamine WT Dye Tracing
- Fluorescein Dye Tracing
- Ammonium
- CDOM
- Crude Oil (Long Wavelength)
- Refined Oil (Short Wavelength)
- Histamine
- Optical Brighteners for Wastewater Treatment

Contact Us for Custom Optical Kits

Highlights of the 10AU

- Exceptional Sensitivity
- Automatic or Manual Ranging
- Analog and Digital Output
- Field Installable Optical Kits
- Easy to Read LCD Display
- Now 20% Lighter!

User Configured Options

- Standard or Red PMT
- Continuous Flow Monitoring or Discrete Sample Analysis

Optional Accessories

- Internal Data Logging & Electronic Chart Recording
- Temperature Compensation for Continuous Flow Measurements
- Solid Secondary Standard

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

10-AU
Field Fluorometer

TURNER DESIGNS

Ordering Information

BASE INSTRUMENT W/ WATERTIGHT CASE	PART NUMBER
10AU Fluorometer with Red PMT	1100-100
10AU Fluorometer with Standard PMT	1100-101

SAMPLE CELL	PART NUMBER
25 mm One-Piece Continuous Flow System	1100-020
25 mm & 13 mm Discrete Sample Test Tube Holder Set	10-AU-030

SOFTWARE	PART NUMBER
Internal Data Logging & Electronic Chart Recording	10-AU-450
Temperature Compensation Package (On-Line Systems)	1100-500

OPTICAL KITS	PART NUMBER
In Vivo & Extractive Chlorophyll *a*	10-037R
Extractive Chlorophyll *a*	10-040R
In Vivo Chlorophyll *a*	10-096R
Blue Green Algae - Phycocyanin (freshwater)	10-305
Blue Green Algae - Phycoerythrin (marine)	10-304
Rhodamine WT Dye	10-041R
Fluorescein Dye	10-086R
Ammonium/CDOM	10-303
Crude Oil (Long Wavelength Oil)	10-302R
Refined Oil (Short Wavelength Oil)	10-301R
Optical Brighteners for Wastewater Treatment	10-302R

Contact Us for Custom Optical Kits

OPTIONAL ACCESSORIES	PART NUMBER
Solid Secondary Standard	10-AU-904
Shipping Case	10-AU-060
12 VDC Power & Signal Cable w/ Clips	10AU-810
Universal Power & Signal Cable, 115 VAC & 230 VAC	10AU-800

10AU Electrical Specifications	
Light Source	Lamp (4 watts, 8000 hours lamp life)
Detector	PhotoMultiplier Tube; Standard (300-650 nm), Red (185-870 nm)
AC Power	100-130 V; 200-240 V, 50/60 Hz, 30 watts
DC Power	11-16 V; 2.5 amperes
Digital Output	100% ASCII data output via RS-232 at 4800 or 9600 bps
Analog Output	0.1, 1, 2, or 5 volts

10AU Detection Limits	
Extracted Chlorophyll *a*	0.025 µg/L using EPA Method 445.0
Rhodamine WT Dye	0.01 ppb RWT in potable water
Fluorescein Dye	0.01 ppb Fluorescein in potable water

10AU Linear Range	
Extracted Chlorophyll *a*	0 - 250 µg/L
Rhodamine WT Dye	0 - 250 ppb
Fluorescein Dye	0 - 250 ppb

10AU Physical Specifications	
Weight	12.6 kg (28.5 lbs)
Height	24 cm (9.45 in)
Width	55 cm (21.65 in)
Depth	34 cm (13.39 in)
Operating Temperature	0-55° C, 32-131° F (ambient)

Contact Us

Toll-Free : 1.877.316.8049
Phone : 408.749.0994
Fax : 408.749.0998

Email : sales@turnerdesigns.com
Web : www.turnerdesigns.com

Address:
845 West Maude Avenue
Sunnyvale, CA 94085

Reliable Instruments for an Unreliable World

998-0865 Rev. C

HOSKIN SCIENTIFIC

CYCLOPS-7
SUBMERSIBLE SENSORS

TURNER DESIGNS

Cyclops-7 Submersible Sensors

The CYCLOPS-7 line of submersible sensors is designed for integration into multi-parameter platforms requiring a high performance, compact sensor at a significantly lower price than traditional submersible sensors. The CYCLOPS-7 combination of price, performance and size make the sensor very attractive for oceanographic, freshwater and dye tracing applications.

Cyclops-7 Highlights

- Integrate into a C6 Multi-Sensor Platform or any third-party platform
- Extremely small size - 4.3" x 0.9"
- Affordable price / excellent value
- Very low power consumption
- Excellent turbidity rejection
- Custom versions available

Fluorometer Performance

Linearity: 0.99R²

Application	Minimum Detection Limit	Dynamic Range
Chlorophyll *a**	0.03 µg/L	500 µg/L
Rhodamine WT	0.04 ppb	1000 ppb
Cyanobacteria	150 cells/mL	2,000,000 cells/mL
CDOM	0.2 ppb QS**	1000 ppb QS**

* Chlorophyll specifications determined with Rhodomonas SP culture
** Quinine Sulfate

Turbidity	0.05 NTU	1000 NTU

Physical Dimensions

Length x Diameter: 4.3" x 0.9", 14.0 x 2.2 cm

Weight: 5.0 oz, 160 gm

Environmental Characteristics

Temperature Range:
Ambient: 0 to 50 deg C
Water Temp: -2 to 50 deg C

Depth Range: 600 meters

Signal Output: 0 - 5 VDC

Supply Voltage Range: 3 - 15 VDC

Power Requirements: <300mW typical

Ordering Information

Chlorophyll *a*	2100-000-C
Blue Green Algae	
• Phycoerythrin	2100-000-E
• Phycocyanin	2100-000-P
Rhodamine	2100-000-R
Fluorescein	2100-000-F
Turbidity	2100-000-T
CDOM	2100-000-U
Optical Brighteners	2100-000-B
Crude Oil	2100-000-O
Contact Us for Custom Optics	

Solid Secondary Standard	2100-900
Flowthrough Cap	2100-600
Shade Cap	2100-700
2' Pigtail Cable w/ locking sleeve	2100-750

Titanium Housing also available

HOSKIN SCIENTIFIC

C3 Submersible Fluorometer

TURNER DESIGNS

C3 Submersible Fluorometer

The C3 Submersible Fluorometer can be configured with up to three optical sensors ranging from the ultraviolet to the infrared spectrum. Internal memory storage capacity combined with an external submersible lithium ion battery allows the C3 to run during extended or short-term deployments. Each C3 comes with a factory installed temperature sensor and a depth rating of 600 meters. An optional factory installed depth sensor and mechanical wiper is also available. The C-Soft Windows based software allows for intuitive calibration, datalogging set up, file management capabilities as well as digital data integration.

Customized Optical Sensors

Choose up to three optical sensors to be factory installed for a variety of applications.

Available Optical Sensors

- Turbidity
- Chlorophyll *a in vivo*
- Blue Green Algae - Phycocyanin
- Blue Green Algae - Phycoerythrin
- Rhodamine Dye
- CDOM
- Crude Oil
- Optical Brighteners

Contact Us for Custom Optics

Highlights of the C3

- Order up to Three Optical Sensors
- Temperature Sensor Included
- Robust Memory – Over 480,000 Data Points!
- Easy to Use C-Soft Software with Data Management Capabilities
- Optional Depth Sensor Available
- Optional Mechanical Wiper Available

Digital integration with a CTD profiler or third party platform

Extended Deployments in the Self-Contained Mode with Submersible Battery

Secondary Solid Standard used to check signal stability or correlating to a primary standard

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

C3 Submersible Fluorometer

TURNER DESIGNS

C3 Physical Specifications

Weight in Air	1.64 kg 3.6 lbs
Length	23 cm 9.1 in
Diameter	10 cm 3.9 in
Material	Delrin Plastic
Temperature	-2 to 50 degrees C.
Depth	0 to 600 meters

C3 Electrical Specifications

External Power	8 to 30 VDC
Output	Digital Signal
Interface	RS232 Interface
Maximum Sample Rate	1 Second
Maximum Power Requirements	1 Watt

Ordering Information

INSTRUMENT	PART NUMBER
C3 Submersible Fluoromter	2300-000

C3 ACCESSORIES	PART NUMBER
C3 Mechanical Wiper	2300-450
Pressure Sensor	2300-360
Submersible Battery Pack	2200-601
Battery Pack Bracket	2300-603
Flow Cap	2300-700
Shade Cap	2300-500
Shade Cap Weight	2300-510
Solid Secondary Standard	2300-900

Cables Also Available, Contact Sales for Details

AVAILABLE FACTORY INSTALLED OPTICS	PART NUMBER
Turbidity	2300-240
Chlorophyll *a in vivo*	2300-200
Blue Green Algae - Phycocyanin	2300-231
Blue Green Algae - Phycoerythrin	2300-230
Rhodamine Dye	2300-210
CDOM	2300-251
Crude Oil	2300-253
Optical Brighteners	2300-252

Contact Us for Custom Optics

Contact Us

Toll-Free : 1.877.316.8049
Phone : 408.749.0994
Fax : 408.749.0998

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Web : www.turnerdesigns.com

Address:
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Sunnyvale, CA 94085

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

C6 Multi-Sensor Platform

TURNER DESIGNS

C6 Multi-Sensor Platform

The C6 Multi-Sensor Platform integrates up to six Cyclops-7 fluorescence and turbidity sensors for extended or short-term deployments. The C6 provides individual automatic gain control, calibration, digital data reporting and datalogging for each Cyclops-7 sensor. Each C6 comes with a factory-installed temperature and pressure sensor. The C6 Windows™ based user interface allows for intuitive calibration, datalogging set up, and file downloading. Existing Cyclops-7 users can easily integrate their sensor into the C6 Multi-Sensor Platform.

Interchangeable Sensors

Interchangeable Sensors

Cyclops-7 sensors can be easily field installed for a variety of applications.

Available Sensors for easy Integration

- Turbidity
- Chlorophyll *a in vivo*
- Blue Green Algae - Phycocyanin
- Blue Green Algae - Phycoerythrin
- Fluorescein Dye
- Rhodamine Dye
- CDOM
- Crude Oil
- Optical Brighteners

Contact Us for Custom Optics

Highlights of the Platform

- Six ports Available for Turner Designs Cyclops-7 Sensors
- Pressure and Depth Integrated
- Fast Sampling Rate
- Windows™ Based User Interface with Data Management
- Robust Memory - Over 100,000 data points!
- Field installable mechanical wiper allows for extended deployments
- Depth Rating up to 600 meters

Integrates up to Six Turner Designs Cyclops Sensors

Interchangeable Sensors and Easy to Install

Add Additional Sensors in the Future

Temperature & Depth Already Integrated

2 Optional Dual-Armed Mechanical Wiper Available

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

C6 Multi-Sensor Platform

TURNER DESIGNS

Robust Memory over 100,000 Lines of Data!

Easy to Mount Battery Bracket with eye holes used for External Lines or Fasteners

2 Dual Armed Mechanical Wiper Minimizes Biofouling

Extended Battery Life over 85 Days at 15 Minute Intervals!

C6 Specifications

Weight in Air	2.74 kg ; 6.0 lbs.
Length	25.8 cm ; 10.2 in
Length with Sensors Attached	33.8 cm ; 13.3 in
Diameter	10.2 cm; 4.0 in
Material	316 Stainless Steel; Delrin
Temperature	-2 to 50 degrees C.
Depth	0-600 meters

C6 Electrical Specifications

External Power	8 to 20 VDC
Output	Digital Signal
Interface	RS232 Interface
Maximum Sample Rate	1 Second

Ordering Information

INSTRUMENT	PART NUMBER
C6 Multi-Sensor Platform	2200-000

C6 ACCESSORIES	PART NUMBER
Mechanical Wiper	2200-450
Wiper Brush Replacement Kit	2200-452
Submersible Battery Pack	2200-601
Battery Pack Bracket	2200-603
Flow Cap	2200-700
Shade Cap	2200-500
Solid Secondary Standard*	2100-900
Boosters (Set of 2)**	2200-900
10 Meter Extender Cable**	105-2595
25 Meter Extender Cable**	105-2596
50 Meter Extender Cable**	105-2597

*Only available for visible wavelengths
**Boosters are required for cables greater than 5 meters in length

CYCLOPS-7 SENSOR	
Turbidity	2100-000-T
Chlorophyll *a in vivo*	2100-000-C
Blue Green Algae - Phycocyanin	2100-000-P
Blue Green Algae - Phycoerythrin	2100-000-E
Fluorescein Dye	2100-000-F
Rhodamine Dye	2100-000-R
CDOM	2100-000-U
Crude Oil	2100-000-O
Optical Brighteners	2100-000-B

Contact Us for Custom Optics

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

PhytoFlash Active Fluorometer

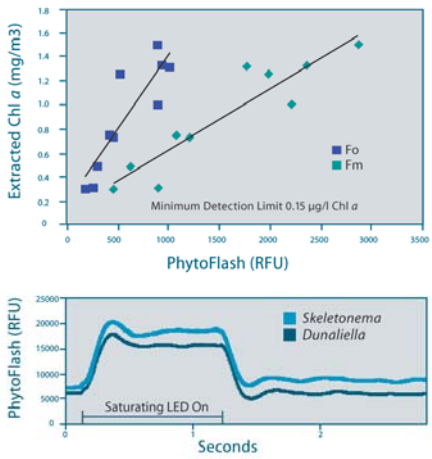
TURNER DESIGNS

PhytoFlash Submersible Active Fluorometer

PhytoFlash is an *in situ* Submersible Active Fluorometer that can be used to determine the quantum efficiency of phytoplankton in both oligotrophic and mesotrophic environments. PhytoFlash is distinct from other fluorescence instruments on the market in that it is the first solid-state instrument capable of variable fluorescence measurements on natural concentrations of phytoplankton. The solid-state platform allows for a much wider range of uses due to its small size, power efficiency, more stable components, and lower price point.

Features

- Digitally integrates into a CTD or third-party system
- Low power consumption <1 W typical
- Extended battery life (Over 35 days at 30 second intervals)
- Large internal data logging memory (10,000 points)
- Optional solid secondary standard provides a quick, easy method to verify calibration
- Reports data in either Relative Fluorescence Units (RFU) or Direct Concentration



Accuracy & Sensitivity

Increased sensitivity for oligotrophic systems (Minimum Detection Limit 0.15 µg/l)

Accurate measurements of (Fo) and (Fm) fluorescence at low concentrations

Versatility

PhytoFlash can be operated in three different modes:

The Self-Contained Mode can be used with the internal data logging system and rechargeable battery pack.

The Integrated Mode allows PhytoFlash to be mated with and controlled by a third-party system.

The Laboratory Mode provides full reporting of the response curve.

Applications

- *In situ* measurement of phytoplankton photosynthetic parameters
- Indicator of nutrient status of planktonic algae
- Detection of the onset of algal blooms
- Oceanographic, estuarine, limnological and riverine studies
- Determination of non-photochemical quenching in laboratory mode
- Measurement of photosynthetic efficiency for all algae using Blue PhytoFlash
- Measurement of photosynthetic efficiency for cyanobacteria (blue-green algae) using Red PhytoFlash

Reliable Instruments for an Unreliable World

HOSKIN SCIENTIFIC

PhytoFlash Active Fluorometer

TURNER DESIGNS

Technique

The PhytoFlash detection system is best described as a short-pulse, multiple turnover variable fluorescence system. The technique utilizes 3 low-intensity LEDs to monitor minimum fluorescence (Fo) and, after saturating the cells in the sample chamber using 6 high-intensity LEDs, measure maximum fluorescence (Fm). The LEDs are arranged to provide an even distribution of light throughout the entire sample volume. The low intensity of the monitoring LEDs prevents an increase in the photosynthetic rate. Users are able to define the saturation duration (200 - 10,000 ms) of the high intensity LEDs. Under the Laboratory Mode users are able to view the response curve. A dark Flow Through Cap is available to allow for dark adaptation for all three modes.

Ordering Information

INSTRUMENT	PART NUMBER
PhytoFlash Submersible Active Fluorometer (Blue Version)	2500-000
PhytoFlash Submersible Active Fluorometer (Red Version)	2500-001
Titanium PhytoFlash Submersible Active Fluorometer (Blue Version)	2500-000-T
Titanium PhytoFlash Submersible Active Fluorometer (Red Version)	2500-001-T

Titanium withstands corrosion better than stainless steel and is recommended for stationary deployments in highly corrosive environments.

PHYTOFLASH ACCESSORIES	PART NUMBER
Submersible Battery Pack	2500-600
Flow Cap	2500-710
Shade Cap	2500-510
Solid Secondary Standard (for Blue PhytoFlash)	2500-900
Solid Secondary Standard (for Red PhytoFlash)	2500-901
2 Foot Analog Interface Cable with Locking Sleeve	2500-170
10 Meter Analog Interface Cable with Locking Sleeve	2500-171
25 Meter Analog Interface Cable with Locking Sleeve	2500-172
50 Meter Analog Interface Cable with Locking Sleeve	2500-173
Interface Cable and 12V Power Supply	2500-150
Dummy Plug	105-2570

Measured Parameters

Fo	Minimum fluorescence
Fm	Maximum fluorescence
Fv	Variable fluorescence (Fm - Fo)
Fv/Fm (yield)	Maximum quantum yield of photochemistry in PSII
Blank	Calculated blank value used in calibration
Response Curve	Available during laboratory mode

PhytoFlash Physical Specifications

Minimum Detection Limit	0.15 µg/l
Dynamic Range*	Low: 0-5 µg/l High 0-100 µg/l
Weight in Air	3.25 lbs (1.47 kg)
Weight in Water	1.01 lbs (0.46 kg)
Length x Diameter	12" x 3" (30.5 cm x 7.6 cm)
Temperature	-2 to 50 degrees C
Depth	600 meters

*Chlorophyll specifications determined with *Dunaliella* monoculture

PhytoFlash Electrical Specifications

Power Requirements	<1 W Typical
Supply Voltage Range	8 - 30 VDC
Detector	Photodiode
Light Source	Light Emitting Diode

Patents Issued 7301158 and 7470917

Contact Us

Toll-Free : 1.877.316.8049
Phone : 408.749.0994
Fax : 408.749.0998

Email : sales@turnerdesigns.com
Web : www.turnerdesigns.com

Address:
845 West Maude Avenue
Sunnyvale, CA 94085

Reliable Instruments for an Unreliable World

S-0070 Rev. F

HOSKIN SCIENTIFIC

SUNA V 2 (Submersible Ultraviolet Nitrate Analyzer)

A Versatile UV Nitrate Sensor for Operation in Diverse Environments

The SUNA V2 (Submersible Ultraviolet Nitrate Analyzer) is a chemical-free UV nitrate sensor based on the ISUS (In Situ Ultraviolet Spectroscopy) UV nitrate measurement technology developed at MBARI. Satlantic has adapted the technology to develop the SUNA V2 to measure nitrate in increasingly more challenging environments including extremely turbid and high CDOM conditions. With improved optics and built-in logic intelligence, the SUNA V2 measures nitrate with industry leading accuracy and stability over a wide range of environmental conditions, from blue-ocean nitraclines to storm runoff in rivers and streams.

The SUNA V2 is the ultimate solution for real-time nutrient monitoring. Every SUNA V2 now comes with our proven universal real-time nitrate processing algorithm, which has been upgraded to include adaptive sampling intelligence that automatically adjusts for signal strength. Also included in every SUNA V2 is a 10 mm pathlength, a class based nitrate calibration, serial data output and a 500 meter depth rating.

In addition to these standard features, a wide range of optional features provide the ability to customize the instrument to meet your specific research and deployment needs.

OPTIONAL FEATURES

- **Reduced 5mm pathlength for high turbidity environments**
- **Active fouling control with fully integrated Hydro-Wiper**
- **Internal data logging and scheduling with 2 GB memory**
- **Full Freshwater & seawater calibrations**
- **USB communications and data download**
- **SDI-12 interface**

SUNA SPECIFICATIONS

PERFORMANCE

Limit of Detection	0.5 µM (FW or SW with T/S correction) 2.0 µM (SW 0-40 psu)
Detection Range	3000 µM (10 mm path length) 4000 µM (5 mm path length)
Accuracy	± 2 µM (± 0.028 mg/l-N) or ± 10% of reading
Short-term precision (at 3σ)	0.3& µM (FW or SW with T/S correction) 2.4 µM (SW 0-40 psu)
Drift (per hour lamp time)	0.3 µM (FW or SW with T/S correction) 1.0 µM (SW 0-40 psu)
Turbidity range	625 NTU* (10 mm path length; absent other absorbing species) 1250 NTU (5 mm path length; absent other absorbing species)

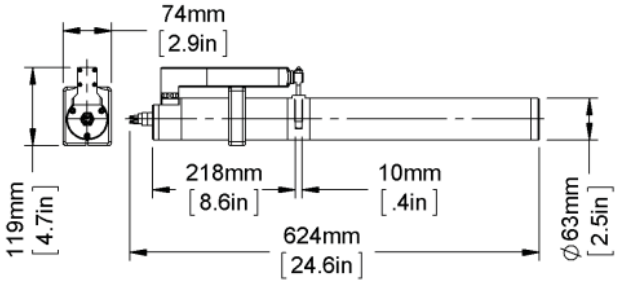
*Nephelometric Turbidity Units

OPTICS

Path Length	10 mm & 5 mm (high turbidity option)
Wavelength Range	190-370 nm
Lamp Type	Continuous Wave, Deuterium Lamp
Lamp Lifetime	900 h

ELECTRICAL

Input Voltage	8-18 VDC & 8-15 with Hydro-Wiper
Power Consumption	7.5 W (0.625 A at 12 V) nominal



HOBO® U26 *Optical Dissolved Oxygen Logger*

The HOBO U26 Dissolved Oxygen logger measures concentrations of oxygen in lakes, streams, rivers, estuaries, and coastal waters. Used by aquatic biologists, hydrologists, and other research professionals to monitor water quality, the U26 is ideal for climate change and environmental impact studies as well as ecological and oceanographic research.

The HOBO U26 combines the high accuracy, robust performance of industry-leading RDO ° Basic (Rugged Dissolved Oxygen) sensor technology with an easy-to-maintain design all at a fraction of the cost of other monitoring options.

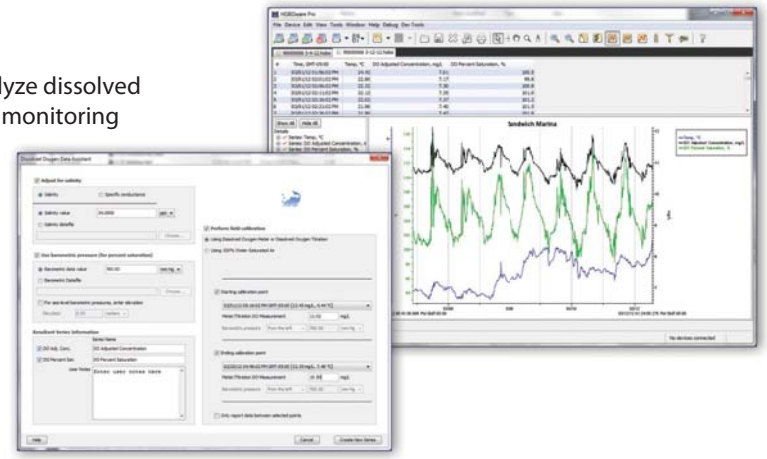
Key Advantages

- Affordable, high performance DO monitoring with 0.2 mg/L accuracy
- Optical DO sensor technology for long-lasting calibration with less maintenance
- Software corrects for measurement drift from fouling; provides salinity-adjusted DO concentration and percent saturation
- Optical USB interface for high-speed, reliable data offload
- Easy-to-replace sensor cap lasts six months

Powerful, Intuitive Software

HOBOware ° Pro software makes it easy to graph and analyze dissolved oxygen data, and offers a number of features that simplify monitoring projects. It features a Dissolved Oxygen Data Assistant which provides salinity-adjusted DO concentration and percent saturation.

The software also provides the option of start-and-end point calibration for added accuracy and to correct for drift in high-fouling environments, and offers one-click data export to Microsoft ° Excel and other programs.



onset®
HOBO® Data Loggers

HOSKIN SCIENTIFIC

HOBO® U26 Optical Dissolved Oxygen Logger

U26 Detailed Specifications

Part number	U26-001
Dissolved Oxygen	
Sensor Type	Optical
Measurement Range	0 to 30 mg/L
Calibrated Range	0 to 20 mg/l; 0 to 35°C (32 to 95°F)
Accuracy	0.2 mg/L up to 8 mg/L; 0.5 from 8 to 20
Resolution	0.02 mg/L
Response Time	To 90% in less than 2 minutes
DO sensor cap life	6 months (cap expires 7 months after initialization)
Temperature	
Operating Temperature and Measurement Range	-5 to 40°C (23 to 104°F), non-freezing
Temperature Accuracy	0.2°C (0.36°F)
Temperature Resolution	0.02°C (0.04°F)
Response Time	To 90% in less than 30 minutes
Logger	
Memory	21,700 sets of DO and temperature measurements (64 KB total memory)
Logging Rate	1 minute to 18 hours
Time Accuracy	±1 minute per month at 25°C (77°F) (see Plot A)
Battery	3.6 V lithium battery; factory replaceable
Battery Life	3 years (at 5 minute logging)
Maximum Depth	100m (328ft)
Wetted Materials	Black Delrin®, PVC, EPDM o-rings, silicone bronze screws; rated for saltwater use

NOTE: If you need to measure DO in saltwater environments, salinity or conductivity measurements are required, which can be conveniently obtained with Onset's HOBO Conductivity/Salinity Logger (U24-002). If you need DO in Percent Saturation, barometric pressure data is required, which can be logged with a HOBO Water Level Logger (U20-001-0X).

Recommended Accessory:

Antifouling Protective Cap

U26-GUARD-2

The Anti-fouling Protective Guard can be used in place of the standard protective guard for protection against fouling during deployment. The anti-fouling guard uses copper windings to reduce bio-fouling, while still allowing good water flow to the sensor.

Environment:The U26-GUARD-2 Replacement is for use in Outdoor and Underwater environments.

HOBO® Conductivity Data Logger

The HOBO U24 Conductivity Logger is a high-accuracy, cost-effective data logger for measuring conductivity and temperature in streams, lakes, and other freshwater sources. Ideal for monitoring aquifers for saltwater intrusion and road and agricultural runoff, the U24 is easy to deploy and maintain. It features a non-contact sensor to minimize drift-related measurement errors, open access to the sensor for cleaning, and software-based drift compensation.

Features

- Non-contact sensor reduces sensor drift for easy maintenance
- Provides easy access to sensor for cleaning and shedding air bubbles
- HOBOware Pro software enables start/end-point calibration to compensate for any fouling and provides easy conversion to specific conductance and salinity
- USB optical interface provides high-speed, reliable data offload in wet environments
- Compatible with the HOBO Waterproof Shuttle for easy and reliable data retrieval and transport

HOBO® Conductivity Data Logger

Specifications

Memory - 18,500 temperature and conductivity measurements when using one conductivity range; 14,400 sets of measurements when using both conductivity ranges (64kbytes)

Sample rate - 1 second to 18 hrs, fixed or multiple-rate sampling with up to 8 user-defined sampling intervals

Battery life - 3 years (@ 1 min logging)

Maximum Depth - 70 m (225')

Operating Range - 0 to 50°C (32° to 122°F) - non freezing

Weight - 193 gm (6.82 ounces), buoyancy in freshwater: -59.8 gm (-2.11 ounces)

Size - 3.18 cm diameter x 16.5 cm, with 6.3 mm mounting hole (1.25" diameter x 6.5", ¼" hole)

Calibrated Range - Conductivity: Low Range: 0 to 1,000 uS/cm; Full Range: 0 to 10,000 uS/cm - Temperature: 5 to 40C (41 to 104F)

Extended Range - Conductivity: Low Range: 0 to 2,500 uS/cm; Full Range: 0 to 15,000 uS/cm - Temperature: 0 to 40C (32 to 104F)

Accuracy - Conductivity: 3% of reading, or 5 uS/cm, whichever is greater / Temperature: 0.1C (0.2F)

Resolution - Conductivity: 1 uS/cm - Temperature: 0.01°C (0.02°F)

Response Time - 1 second to 90% of change

CE - Not CE compliant yet

Water quality monitoring that's field-ready

Surface Water & Ground Water Monitoring

Capturing accurate data in freshwater environments is easy with EXO.

Out of the box, EXO is ready to go with:

- Pre-installed sensors for easy set-up of factory-configured systems
- Wireless communication reduces number of field cables
- Onboard diagnostics mitigate set-up and configuration errors

EXO1 sonde

- Surface and groundwater monitoring down to 250 m (828 ft)
- Bluetooth wireless communication
- Quick and easy calibration of multiple sensors
- Welded titanium sensors including conductivity, dissolved oxygen, fDOM, pH, ORP, turbidity, and total algae

EXO2 sonde

- CTD plus 3-5 additional sensors
- Coastal and marine monitoring down to 250 m (828 ft)
- Seamless integration and "daisy chaining" into monitoring systems
- Flexible sensor payload/configurations
- Welded titanium sensors
- Antifouling wiper helps to extend deployments to more than 90 days

With a highly efficient power management platform, robust construction, and a chemistry-free anti-fouling system, EXO allows accurate data collection for up to 90 days between service intervals.

Instrument Specifications *

EXO1 Sonde		
Ports	4 sensor ports Peripheral port: 1 power communication port	
Size	Diameter: 4.70 cm (1.85 in) Length: 64.77 cm (25.50 in)	
Weight	1.42 kg (3.15 lbs) with 4 probes, guard and batteries installed	
EXO2 Sonde		
Ports	7 sensor ports (6 ports available when central wiper used) Peripheral ports: 1 power communication port; 1 auxiliary expansion port	
Size	Diameter: 7.62 cm (3.00 in) Length: 71.10 cm (28.00 in)	
Weight	3.60 kg (7.90 lbs) with 5 probes, guard and batteries installed	
Sondes		
Operating Temperature	-5 to 50˚C	
Storage Temperature	-20 to 80˚C (except 0 to 60˚C for pH and pH/ORP sensors)	
Depth Rating	0 to 250 m (0 to 820 ft)	
Communications	Computer Interface: Bluetooth wireless technology, RS-485, USB Output Options: USB with signal output adapter (SOA); RS-232 & SDI-12 with DCP-SOA	
Sample Rate	Up to 4 Hz	
Battery Life	90 days **	
Data Memory	512 MB total memory; >1,000,000 logged readings	
Sensors		**Calculated Parameters**
Ammonium **	ORP	Salinity
Chloride **	pH	Specific Conductance
Conductivity	Temperature	Total Dissolved Solids
Depth	Total Algae (Chlorophyll + BGA-PC or PE **)	Total Suspended Solids
Dissolved Oxygen	Turbidity	
Fluorescent Dissolved Organic Matter (fDOM)	Vented Level **	
Nitrate **		
EXO Handheld		
Size	Width: 12.00 cm (4.72 in) Height: 25.00 cm (9.84 in)	
Weight	0.71 kg (1.56 lbs) without batteries	
Operating System	Windows CE 5.0	
Operating Temperature	-10 to 50˚C	
Storage Temperature	-20 to 80˚C	
IP Rating	IP-67	
Data Memory	2 GB total memory; >2,000,000 data sets	
Accessories		
Cables (non-vented)	Flow cells	Sonde/sensor guard
Carrying case	KOR software	Calibration cup
DCP Signal Output Adapter	USB Signal Output Adapter	Anti-fouling components
Warranty		
1 Year	pH, ORP, and optical DO membranes	
2 Years	Cables, sondes (bulkheads), handheld, and the following sensors: conductivity, temperature, depth, and optical sensors	

* Specifications indicate typical performance and are subject to change. Please check EXOwater.com for up-to-date information.

** Typically 90 days at 20˚C at 15-minute logging interval; temperature/conductivity, pH/ORP, DO, and turbidity sensors installed on EXO1; or temperature/conductivity, pH/ORP, DO, total algae, and turbidity sensors installed with central wiper that rotates once per logging interval on EXO2. Battery life is heavily dependent on sensor configuration.

EXO Bluetooth modules comply with Part 15C of FCC Rules and have FCC, CE Mark and C-tick approval. Bluetooth-type approvals and regulations can be country specific. Check local laws and regulations to insure that the use of wireless products purchased from Xylem are in full compliance.

** Release in 2013. BGA-PE specs TBD.

Sensor Specifications *

Sensor	Range	Accuracy *	Response	Resolution
Ammonium** [11] (ammonia with pH sensor)	0 to 200 mg/L [1]	±10% of reading or 2 mg/L-N, w.i.g.	-	0.01 mg/L
Barometer	375 to 825 mmHg	±1.5 mmHg from 0 to 50°C	–	0.1 mmHg
Blue-green Algae Phycocyanin (PC) or Phycoerythrin (PE)** (part of Total Algae sensor)	0 to 100 µg/L PC; 0 to 100 RFU	Linearity: R^2 [2] > 0.999 for serial dilution of Rhodamine WT solution from 0 to 100 µg/mL PC equivalents Detection Limit: 0.04 µg/L PC	T63<2 sec	0.01 µg/L PC; 0.01 RFU
Chloride** [11]	0 to 1000 mg/L [2]	±15% of reading or 5 mg/L, w.i.g.	–	0.01 mg/L
Chlorophyll (part of Total Algae sensor)	0 to 400 µg/L Chl; 0 to 100 RFU	Linearity: R^2 [2] > 0.999 for serial dilution of Rhodamine WT solution from 0 to 400 µg/L Chl equivalents Detection Limit: 0.09 µg/L Chl	T63<2 sec	0.01 µg/L Chl; 0.01 RFU
Conductivity [3]	0 to 200 mS/cm	0 to 100: ±0.5% of reading or 0.001 mS/cm, w.i.g.; 100 to 200: ±1% of reading	T63<2 sec	0.0001 to 0.01 mS/cm (range dependent)
Depth [4] (non-vented)	0 to 10 m (0 to 33 ft)	±0.04% FS (±0.004 m or ±0.013 ft)	T63<2 sec	0.001 m (0.001 ft) (auto-ranging)
	0 to 100 m (0 to 328 ft)	±0.04% FS (±0.04 m or ±0.13 ft)		
	0 to 250 m (0 to 820 ft)	±0.04% FS (±0.10 m or ±0.33 ft)		
Vented Level**	0 to 10 m (0 to 33 ft)	±0.03% FS (±0.003 m or ±0.010 ft)		
Dissolved Oxygen Optical	0 to 500% air saturation	0 to 200%: ±1% of reading or 1% saturation, w.i.g.; 200 to 500%: ±5% of reading [5]	T63<5 sec [6]	0.1% air saturation
	0 to 50 mg/L	0 to 20 mg/L: ±0.1 mg/L or 1% of reading, w.i.g.; 20 to 50 mg/L: ±5% of reading [5]		0.01 mg/L
fDOM	0 to 300 ppb Quinine Sulfate equivalents (QSE)	Linearity: R^2 [2] > 0.999 for serial dilution of 300 ppb QS solution Detection Limit: 0.07 ppb QSE	T63<2 sec	0.01 ppb QSE
Nitrate** [11]	0 to 200 mg/L-N [1]	±10% of reading or 2 mg/L-N, w.i.g.	–	0.01 mg/L
ORP	-999 to 999 mV	±20 mV in Redox standard solutions	T63<5 sec [7]	0.1 mV
pH	0 to 14 units	±0.1 pH units within ±10°C of calibration temp; ±0.2 pH units for entire temp range [8]	T63<3 sec [9]	0.01 units
Salinity (Calculated from Conductivity and Temperature)	0 to 70 ppt	±1.0% of reading or 0.1 ppt, w.i.g.	T63<2 sec	0.01 ppt
Specific Conductance (Calculated from Conductivity and Temperature)	0 to 200 mS/cm	±0.5% of reading or .001 mS/cm, w.i.g.	–	0.001, 0.01, 0.1 mS/cm (auto-scaling)
Temperature	-5 to 50°C	-5 to 35°C: ±0.01°C [10] 35 to 50°C: ±0.05°C [10]	T63<1 sec	0.001 °C
Total Dissolved Solids (TDS) (Calculated from Conductivity and Temperature)	0 to 100,000 g/L Cal constant range 0.30 to 1.00 (0.64 default)	Not Specified	–	variable
Total Suspended Solids (TSS) (Calculated from Turbidity and TDS)	0 to 1500 mg/L	Not Specified	T63<2 sec	variable
Turbidity [11]	0 to 4000 FNU	0 to 999 FNU: 0.3 FNU or ±2% of reading, w.i.g.; 1000 to 4000 FNU: ±5% of reading [12]	T63<2 sec	0 to 999 FNU: 0.01 FNU; 1000 to 4000 FNU: 0.1 FNU

All sensors have a depth rating to 250 m (820 ft), except shallow and medium depth sensors and ISEs. EXO sensors are not backward compatible with 6-Series sondes.

* Specifications indicate typical performance and are subject to change. Please check EXOwater.com for up-to-date information.
Accuracy specification is attained immediately following calibration under controlled and stable environmental conditions. Performance in the natural environment may vary from quoted specification.

[1] 0-30°C [2] 0-40°C w.i.g. = whichever is greater
[3] Outputs of specific conductance (conductivity corrected to 25°C) and total dissolved solids are also provided. The values are automatically calculated from conductivity according to algorithms found in Standard Methods for the Examination of Water and Wastewater (Ed. 1989).
[4] Accuracy specifications apply to conductivity levels of 0 to 100,000 µS/cm.
[5] Relative to calibration gases
[6] When transferred from air-saturated water to stirred deaerated water
[7] When transferred from water-saturated air to Zobell solution
[8] Within the environmental pH range of pH 4 to pH 10
[9] On transfer from water-saturated air to rapidly stirred air-saturated water at a specific conductance of 800 µS/cm at 20°C; T63<5 seconds on transfer from water-saturated air to slowly-stirred air-saturated water.
[10] Temperature accuracy traceable to NIST standards
[11] Calibration: 1-, 2-, or 3-point, user-selectable
[12] Specification is defined in AMCO-AEPA Standards

** Release in 2013. BGA-PE specs TBD.

YSI 600QS (Quick Sample™)

The Easy Solution to Handheld Sampling

Packaged for convenience, the combination of the YSI 650MDS display-datalogger and the YSI 600QS sonde allows you to collect 9 parameters simultaneously in real time. Designed for reliable field use, the 650MDS features an IP-67, impact-resistant case, and utilizes internal, non-volatile flash memory that prevents data loss and stores 150 data sets. The 600QS sonde is compact, submersible to 61 m (200 ft) and employs YSI's unprecedented sensor reliability and parameter measurement systems. The 600QS system provides a reliable way to quickly sample fresh, brackish, sea, and polluted waters.

The 600QS (Quick Sample)

- **Rapid-Pulse™ stirring-independent dissolved oxygen, accepted for compliance monitoring**
- **Collect 9 parameters simultaneously in real time**
- **Dissolved oxygen, dissolved oxygen % saturation, temperature, conductivity, pH, ORP[1], and depth[1] are measured simultaneously**
- **Specific conductance, salinity, total dissolved solids and resistivity are calculated and displayed with measured parameters at the users discretion**
- **Small compact sonde fits easily into 2-inch wells**
- **Compatible with EcoWatch® for Windows® data analysis software[2]**
- **Menu-driven, easy-to-use interface for 650MDS and 600QS sonde to PC**
- **Sonde communicates via RS-232 to 650MDS and PC, and via SDI-12 to data collection platforms**
- **Easy-to-use sensor diagnostics that help insure accurate, high quality data acquisition**
- **3-year warranty on the 650MDS and 2-year warranty on the 600QS sonde.[3]**

[1] optional sensor, [2] EcoWatch is not necessary for operation, calibration or sensor diagnostics
[3] refer to warranty statement for conditions: extended warranties are also available

Feature-Packed Performance

Battery Life

With the standard alkaline battery configuration of 4 C-cells, the YSI 650 will power itself and a YSI 6600 sonde continuously for approximately 30 hours. Or, choose the rechargeable battery pack option with quick-charge feature.

Optional GPS Interface

Designed to NMEA protocol, the YSI 650MDS will display and log real-time GPS readings with a user supplied GPS interfaced with YSI 6-Series sondes.

Pure Data for a Healthy Planet.®

A cost-effective combination of two outstanding YSI products

YSI 600QS Display & Datalogger (650MDS) Specifications

Temperature	Operating Storage	-10 to +60°C for visible display -20 to +70°C
Waterproof Rating		IP-67 for both the standard alkaline battery configuration and for the rechargeable battery pack option
Connector		MS-8; meets IP-67 specification
Dimensions	Width Length Weight with batteries	4.7 in, 11.9 cm 9 in, 22.9 cm 2.1 lbs, 0.91 kg
Display		VGA; LCD with 320 by 240 pixels with backlight
Power	Standard Optional	4 alkaline C-cells with detachable battery cover Ni metal hydride battery pack with attached battery cover and 110/220 volt charging system
Communications		RS-232 to all sondes, for data transfer to PC, and for software updates
Optional GPS		NMEA 0183; requires user-supplied GPS and YSI 6115 Y-cable
Backlight		4 LEDs illuminating LCD; user-selectable
Keypad		20 keys, including instrument on/off, backlight on/off, enter, esc, 10 number/letter entry keys, 2 vertical arrow keys, 2 horizontal arrow keys, period key, and minus key
Warranty		3 years

YSI 600QS Sonde (600R) Specifications

Medium		Fresh, sea or polluted water
Dimensions	Diameter Length Weight	1.65 in, 4.2 cm 14 in, 35.6 cm 1.1 lbs, 0.5 kg
Power		External only, 12 V DC or power supplied by 650MDS

Sensor	Range	Resolution	Accuracy
Rapid Pulse™ Dissolved Oxygen, % air saturation	0 to 500%	0.1 %	0 to 200% : ± 2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading
Rapid Pulse™ Dissolved Oxygen, mg/L	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.2 mg/L or 2% of reading, whichever is greater; 20 to 50 mg/L: ±6% of reading
Conductivity•	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range-dependent)	±0.5% of reading + 0.001 mS/cm
Salinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature	-5 to +50°C	0.01°C	±0.15°C
pH	0 to 14 units	0.01 unit	±0.2 unit
ORP	-999 to +999 mV	0.1 mV	±20 mV
Depth Medium	0 to 200 feet, 0 to 61 m	0.001 feet, 0.001 m	±0.4 feet, ±0.12 m

• Report outputs of specific conductance (conductivity corrected to 25°C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algorithms found in Standard Methods for the Examination of Water and Wastewater (ed 1989).

Ordering Information

600QS-01	Temperature, Conductivity, pH, DO, 25 ft. Detachable Cable, 650-01 MDS, 600QS Sonde
600QS-02	Temperature, Conductivity, pH, DO, 25 ft. Detachable Cable, 650-01 MDS, 600QS Sonde, Depth 0-200 ft.
600QS-03	Temperature, Conductivity, pH, DO, 50 ft. Detachable Cable, 650-01 MDS, 600QS Sonde
600QS-04	Temperature, Conductivity, pH, DO, 50 ft. Detachable Cable, 650-01 MDS, 600QS Sonde, Depth 0-200 ft.
600QS-05	Temperature, Conductivity, pH/ORP, DO, 25 ft. Detachable Cable, 650-01 MDS, 600QS Sonde
600QS-06	Temperature, Conductivity, pH/ORP, DO, 25 ft. Detachable Cable, 650-01 MDS, 600QS Sonde, Depth 0-200 ft.
600QS-07	Temperature, Conductivity, pH/ORP, DO, 50 ft. Detachable Cable, 650-01 MDS, 600QS Sonde
600QS-08	Temperature, Conductivity, pH/ORP, DO, 50 ft. Detachable Cable, 650-01 MDS, 600QS Sonde, Depth 0-200 ft.

ANALITE NEP495
TURBIDITY & TEMPERATURE LOGGING PROBE

The ANALITE NEP495 turbidity probes can monitor and log turbidity and temperature in a sturdy self-contained package that is easy to set up and easy to selectively download the data collected.

The ANALITE NEP495 microprocessor based turbidity probe is designed for monitoring and logging applications where turbidity levels of up to 1,000NTU may be encountered. Available ranges are 40NTU, 100NTU, 400NTU and 1,000NTU, which can be set by the user. The ANALITE NEP495 probe, with its integral wiper assembly, is designed to operate over an extended period of time where bio-fouling or sedimentation build-up is likely. The ANALITE NEP495 turbidity probes may be submerged to a depth rating of 100 meters (approx. 330 feet).

The ANALITE NEP495 probe use 90° optics and employs infrared light in accordance with ISO7027 and use a unique modulation technique that ensures almost total rejection of ambient light conditions. The salient features of the ANALITE NEP495 probes are tabled below:

Feature	NEP495
RS232 Interface	Yes
Integral and Auto Wiping	Yes
Turbidity Logging	Yes
Temperature Logging	Yes
User Range Select	Yes
User Calibrate	Yes
Firmware Upgradeable	Yes

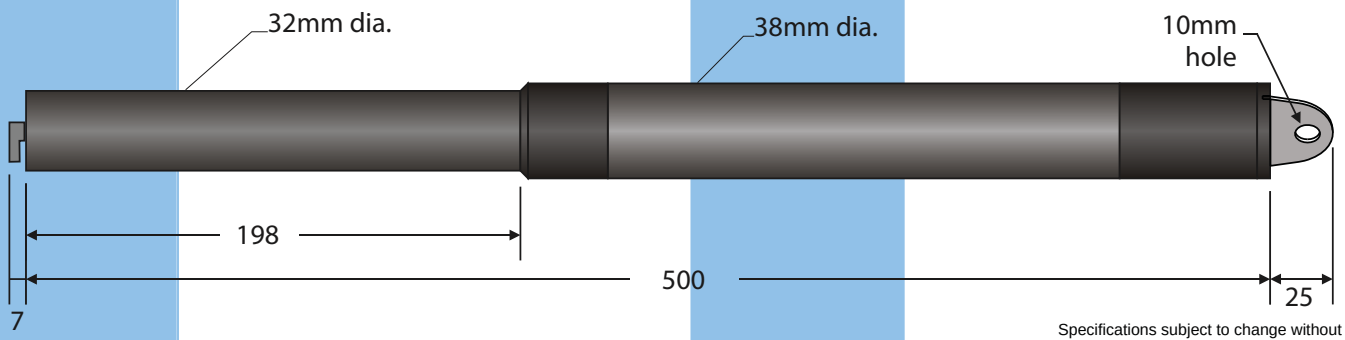
The user may calibrate the probe at any time as well as allowing later versions of firmware to be uploaded by the user via the RS232 interface.

The ANALITE NEP495 probes are similar to the ANALITE NEP395 probe but with the inclusion of temperature measurement and a flexible self contained logging function. As normally supplied, the ANALITE NEP495 can store over 30,000 data sets with each data set consisting of turbidity, temperature, time and date. Logging intervals can be set from less than 1 second to over 18 hours. Data is stored in non-volatile memory.

The ANALITE NEP495 is self-contained requiring no external power or commands once logging has commenced. The internal batteries have a life expectancy of over 30,000 data sets or about 60 days - whichever comes first and assuming a wipe prior to each reading.

Specifications:

Technique	90° Infra-Red (ISO7027).
Range	40, 100, 400 and 1,000NTU – set by user, factory default setting is 100NTU.
Resolution	**Range** / **Resolution** 40NTU ±0.01NTU 100NTU ±0.02NTU 400NTU ±0.1NTU 1,000NTU ±0.2NTU
Repeatability	±1% at 25°C.
Linearity	Better than 1% for 40NTU, 100NTU and 400NTU, 3% for 1,000NTU (using 3 point calibration).
Temperature	-10°C to 50°C with ±0.1°C resolution and ±0.5°C accuracy. Time constant 50 seconds in water.
Output	RS232 – 1200, 2400, 4800 or 9600BPS, 7 data bits, even parity, one stop bit. The factory default setting is 9600BPS.
Measurements	**RS232 Realtime** Latest turbidity measurement. Mean and Sample Variance. Median. Minimum. Maximum. Probe battery voltage. External (water) temperature. **RS232 Logging** Each logging point generates a data set containing: Turbidity in NTU Water Temperature in °C Time the data set was recorded. Date the data set was recorded.
Logging Interval	User set, from 1 second to over 18 hours in 1 second increments. Factory set to 900 seconds (15 mins).
Data Capacity	32,000 data sets minimum but depends on memory capacity installed in the probe. Memory technology is FlashRAM Logging stops when memory is full.
Calibration	Turbidity - 2 or 3-point calibration for each range. May be set by the user only through the RS232 interface and for the range selected. Can revert back to factory calibration settings after user calibration. Temperature – factory calibration only.
Power	3 off – C cells alkaline. 0.5mA STANDBY, 15mA ON. 40mA ON and wiping.
Wipe Time	8 seconds nominal.
Weight	1,800gms - including batteries.
Dimensions	532mm long overall, 38mm diameter.
Construction	316 Stainless steel casing. Screw on End Cap to allow battery replacement and PC connection via RS232 interface.
Depth Rating	100m (330ft) static water column.
Operating Temp.	-10°C to 50°C.
Storage Temp.	-20°C to 55°C.
Download Cable	3 meters with DB9 termination.
Accessories	Protective shroud for optics. NEP49SHRD 38mm dia. Replacement wiper kits NEP19WIPE.



Specifications subject to change without notice.
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600OMS V2 Optical Monitoring System

Dissolved Oxygen, Turbidity, Chlorophyll, Blue-Green Algae, or Rhodamine in a Low-Cost Package

Measure any one of the parameters above in combination with temperature, conductivity, and depth or vented level in fresh, sea, or polluted water.

The YSI 600OMS V2 and optical sensors

The 600OMS V2 can take advantage of the newest optical sensors from YSI: ROX Reliable Oxygen (YSI 6150) and two new blue-green algae sensors (YSI 6131 phycocyanin and YSI 6132 phycoerythrin). Utilize the field-proven YSI 6136 turbidity sensor, the YSI 6025 chlorophyll sensor, as well as the revolutionary YSI 6130 rhodamine WT sensor. The OMS V2 also incorporates innovations in sensor configuration such as a conductivity and temperature module that fits into the sonde body.

- **Wiped optics for maximum anti-fouling protection**
- **Ideal for long-term deployments**
- **Low power requirements**
- **Field-replaceable optical sensors**
- **150,000 reading memory**
- **Integrate with DCPs**
- **Compatible with EcoWatch® for Windows® data analysis software**
- **Compatible with YSI 650MDS display and datalogger**

Pure Data for a Healthy Planet.®

Low-cost, single parameter optical monitoring system

Sensor performance verified*

The 600OMS V2 sonde uses sensor technology that was verified through the US EPA's Environmental Technology Verification Program (ETV). For information on which sensors were performance-verified, turn this sheet over and look for the ETV logo.

YSI 600OMS Sensor Specifications

	Range	Resolution	Accuracy
ROX™ Optical Dissolved Oxygen• % Saturation	0 to 500%	0.1%	0 to 200%: ±1% of reading or 1% air saturation, whichever is greater; 200 to 500%: ±15% of reading
ROX™ Optical Dissolved Oxygen• mg/L	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.1 mg/L or 1% of reading, whichever is greater; 20 to 50 mg/L: ±15% of reading
Conductivity••	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range dependent)	±0.5% of reading + 0.001 mS/cm
Salinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature	-5 to +50°C	0.01°C	±0.15°C
Depth Medium Shallow Vented Level	0 to 200 ft, 61 m 0 to 30 ft, 9.1 m 0 to 30 ft, 9.1 m	0.001 ft, 0.001 m 0.001 ft, 0.001 m 0.001 ft, 0.001 m	±0.4 ft, ±0.12 m ±0.06 ft, ±0.02 m ±0.01 ft, 0.003 m
Turbidity• 6136 Sensor*	0 to 1,000 NTU	0.1 NTU	±2% of reading or 0.3 NTU, whichever is greater**
Rhodamine• ETV	0-200 µg/L	0.1 µg/L	±5% reading or 1 µg/L, whichever is greater

• Maximum depth rating for all optical probes is 200 feet, 61 m.
•• Report outputs of specific conductance (conductivity corrected to 25° C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algorithms found in *Standard Methods for the Examination of Water and Wastewater* (ed 1989).

**In YSI AMCO-AEPA Polymer Standards.

	Range	Detection Limit	Resolution	Linearity
BGA - Phycocyanin•	~0 to 280,000 cells/mL† 0 to 100 RFU	~220 cells/mL§	1 cell/mL 0.1 RFU	$R^2 > 0.9999$**
BGA - Phycoerythrin•	~0 to 200,000 cells/mL† 0 to 100 RFU	~450 cells/mL§§	1 cell/mL 0.1 RFU	$R^2 > 0.9999$***
Chlorophyll• 6025 Sensor* ETV	~0 to 400 µg/L 0 to 100 RFU	~0.1 µg/L§§§	0.1 µg/L Chl 0.1% RFU	$R^2 > 0.9999$****

• Maximum depth rating for all optical probes is 200 feet, 61 m.
BGA = Blue-Green Algae
RFU = Relative Fluorescence Units
~ = Approximately

† Explanation of Ranges can be found in the 'Principles of Operation' section of the 6-Series Manual, Rev D.

§ Estimated from cultures of *Microcystis aeruginosa.*
§§ Estimated from cultures *Synechococcus sp.*
§§§ Determined from cultures of *Isochrysis sp.* and chlorophyll *a* concentration determined via extractions.

**Relative to serial dilution of Rhodamine WT (0-400 ug/L).
***Relative to serial dilution of Rhodamine WT (0-8 µg/L).
****Relative to serial dilution of Rhodamine WT (0-500 ug/L).

YSI 600OMS V2 Sonde Specifications

Medium		Fresh, sea or polluted water
Dimensions	Diameter Length Weight Weight with Batteries	1.65 in, 4.2 cm 21.3 in, 54.1 cm 1.3 lbs, 0.6 kg 1.4 lbs, 0.7 kg
Power	External Internal Battery Option	12 V DC 4 AA Alkaline cells, 25 to 30 days at 15 minute sampling interval at 25°C

Ordering Information

600-01	600OMS V2 sonde, conductivity, temperature, optical port
600-02	600OMS V2 sonde, conductivity, temperature, optical port, internal batteries
600-03	600OMS V2 sonde, conductivity, temperature, optical port, shallow depth
600-04	600OMS V2 sonde, conductivity, temperature, optical port, shallow depth, internal batteries
600-05	600OMS V2 sonde, conductivity, temperature, optical port, medium depth
600-06	600OMS V2 sonde, conductivity, temperature, optical port, medium depth, internal batteries
600-07	600OMS V2 sonde, conductivity, temperature, optical port, shallow vented depth
600-08	600OMS V2 sonde, conductivity, temperature, optical port, shallow vented depth, internal batteries

NEW

600XL V2-1 and 600XLM V2-1 Sondes

Measure multiple parameters simultaneously

The YSI 600XL V2 and YSI 600XLM V2 compact sondes measure multiple parameters simultaneously, including:

- Temperature
- Conductivity
- pH
- ORP
- Depth or Level
- Specific Conductance
- Salinity
- Resistivity
- TDS

Both sondes have one optical port, allowing for measurement of an additional parameter with one of the following optical sensors:

- ROX™ Optical Dissolved Oxygen
- Turbidity
- Chlorophyll
- Blue-Green Algae (freshwater or marine)
- Rhodamine WT

Each optical sensor has an integrated anti-fouling wiper which prolongs deployment times (thus reducing operating costs) and improves the quality of data.

Left: 600XL V2-1 with two-piece probe guard; right: 600XLM V2-1 sonde with optical DO sensor (bottom) and batteries (top)

Economical Logging and Spot Sampling System

The YSI 600XLM V2 is an economical logging system for long-term, *in situ* monitoring, profiling, and spot sampling. It will log all parameters at programmable intervals and store 150,000 readings. At one-hour intervals, the instrument will log data for about 75 days utilizing its own power source. The 600XL V2 can also be used in the same manner with user-supplied external power.

- **Either sonde fits down 2" wells (1.65" OD)**
- **Optical sensor port provides a multipurpose platform**
- **Field-replaceable sensors for quicker maintenance**
- **Easily connects to data collection platforms**
- **Anti-fouling wipers on optical sensors extend deployment times**
- **Compatible with YSI 650 Multiparameter Display System**
- **Flow cell available for pump-through applications**
- **Horizontal measurements in very shallow waters**

Connect with Data Collection Platforms

Either sonde can easily connect to the YSI 650 handheld logger/display, YSI 6200 DAS (Data Acquisition System), web-enabled YSI EcoNet® or your own data collection platform, via SDI-12, for remote and real-time monitoring applications.

Pure Data for a Healthy Planet.®

Multiparameter sampling or logging in a compact sonde for ground water, dredging, and spot sampling applications

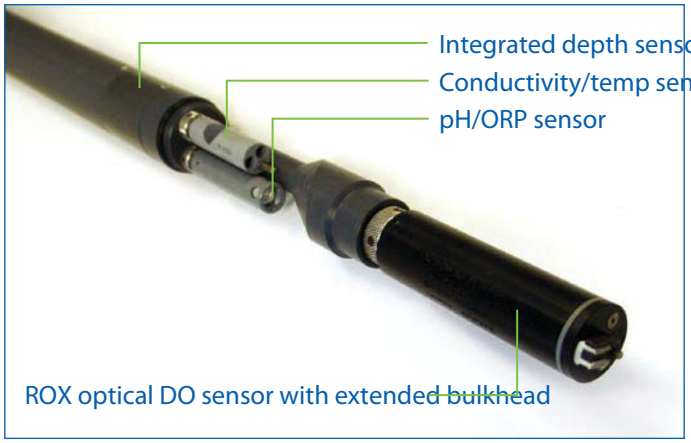
Sonde Features

- **ROX™ Optical DO:** An extremely durable DO sensor with excellent stability, insensitivity to hydrogen sulfide, and integrated anti-fouling wiper, which results in the longest deployment times while reducing operating costs.
- **Field-Replaceable Sensors** allow users to quickly and easily replace damaged sensors in the field or reconfigure a sonde for multiple applications by switching optical sensors.
- **Power Management:** Battery life is 34 days at a 15-minute interval or 75 days at a 1-hour interval with optical DO sensor installed.
- **Key Applications:** ground water monitoring, dredging, spot sampling, education, and long-term monitoring studies.

YSI 600XL V2-1 and 600XLM V2-1 Sonde Specifications

Available Sensors*		Temperature, conductivity, pH, ORP, optional depth (shallow, medium, or shallow vented), and one optical sensor (dissolved oxygen, turbidity, chlorophyll, rhodamine, or blue-green algae)
Operating Environment		
	Medium	Fresh, sea, or polluted water
	Temperature	-5 to 50˚C
	Depth	0 to 200 ft (61 m) for sonde
Storage Temperature		-40 to 60˚C for sonde and sensors except pH and pH/ORP -10 to 60˚C for pH and pH/ORP sensors
Material		PVC, stainless steel
Diameter		1.65 in (4.19 cm)
Length	600XL V2	25.1 in (63.8 cm) without depth sensor; 27.1 in (68.8 cm) with depth and no bottom weight
	600XLM V2	28.5 in (72.4 cm) without depth sensor; 30.5 in (77.5 cm) with depth and no bottom weight
Weight	600XL V2	1.96 lbs. (0.87 kg) with depth and no bottom weight
	600XLM V2	2.15 lbs. (1.05 kg) with depth and no bottom weight
Communications		RS-232C, SDI-12
Memory		384 kb (150,000 individual parameter readings)
Power	600XL V2	External 12 V DC
	600XLM V2	4 AA Alkaline batteries or external 12 V DC
Battery Life		Approximately 30 days at 20˚C at a 15-minute logging interval with optical DO, temperature, conductivity, pH/ORP, and depth sensors operative

** Note: Rapid Pulse™ polarographic-style DO sensor is not available on the V2 sondes. Please refer to the 600XL or 600XLM sondes.*



ROX optical DO sensor with extended bulkhead

Standard Accessories

- Two-piece probe guard with bottom weight
- Carrying case
- 8, 25, 50, and 100 ft cables (other lengths available)
- Long calibration cup
- EcoWatch® software
- Maintenance kit
- Flow cell kit (optional)

YSI Environmental

NEW

YSI 6820 and 6920 V2 Sondes

With 2 optical ports and new sensor options

The YSI 6820 V2 and 6920 V2 Sondes

Measure multiple parameters simultaneously including:

- Temperature
- Conductivity
- Specific Conductance
- Salinity
- Resistivity
- TDS
- pH
- ORP
- Depth or Level
- Nitrate, Ammonium or Chloride

And 2 of the following optical sensors:

- ROX Optical DO *NEW*
- Turbidity
- Chlorophyll
- Blue-Green Algae *NEW*
  (Phycocyanin or Phycoerythrin)
- Rhodamine

- Self-cleaning optical sensors with improved wiping
- Field-replaceable sensors
- 6920 V2 has a built-in battery compartment for long-term *in situ* monitoring

Take Advantage of YSI's New Optical Sensors

In addition to turbidity, chlorophyll, and rhodamine, YSI now offers these optical sensors:

ROX Reliable Optical Dissolved Oxygen

The ROX sensor uses lifetime luminescence detection technology to offer the most reliable oxygen sensor with the lowest possible maintenance effort. Experience significantly less membrane maintenance while obtaining excellent accuracy, sensitivity, and range.

ROX

Blue-Green Algae (BGA)

YSI's fluorescence-based blue-green algae sensors will allow you to monitor blue-green algae populations where their presence is a concern. Whether providing an early warning to an algal bloom, tracking taste and odor-causing species in drinking water supplies, or conducting ecosystem research; YSI BGA sensors will provide sensitive and reliable *in situ* data.

Pure Data for a Healthy Planet.®

Upgraded, compact sondes for field sampling and data collection platforms

6820 and 6920 Upgrades Available

YSI is committed to offering our customers reliable and cost-effective water monitoring solutions. To this end, we are offering V2 Upgrades for existing 6820/6920s. Upgrades will be available from YSI Authorized Service Centers and will include the new 6820/6920 V2 bulkhead, an Optical Dissolved Oxygen Sensor, and firmware/software upgrades. In addition, the sonde will be fully tested and calibrated by an experienced YSI service technician.

Sensor performance verified*

ETV

The 6820 V2 and 6920 V2 sondes use sensor technology that was verified through the US EPA's Environmental Technology Verification Program (ETV). For information on which sensors were performance-verified, turn this sheet over and look for the ETV logo.

HOSKIN SCIENTIFIC

YSI 6820 V2 & 6920 V2 Sensor Specifications

	Range	Resolution	Accuracy
Optical Dissolved Oxygen• % Saturation	0 to 500%	0.1%	0 to 200%: ±1% of reading or 1% air saturation, whichever is greater; 200 to 500%: ±15% of reading
Optical Dissolved Oxygen• mg/L	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.1 mg/L or 1% of reading, whichever is greater; 20 to 50 mg/L: ±15% of reading
Conductivity•• 6560 Sensor ETV	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range-dependent)	±0.5% of reading + 0.001 mS/cm
Salinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature 6560 Sensor ETV	-5 to +70°C†	0.01°C	±0.15°C
pH 6561 Sensor ETV	0 to 14 units	0.01 unit	±0.2 unit
ORP	-999 to +999 mV	0.1 mV	±20 mV
Depth			
Vented Level	0 to 30 feet, 0 to 9 m	0.001 feet, 0.0003 m	±0.01 feet, 0.003 m
Shallow	0 to 30 feet, 0 to 9 m	0.001 feet, 0.0003 m	±0.06 feet, ±0.02 m
Medium	0 to 200 feet, 0 to 61 m	0.001 feet, 0.001 m	±0.4 feet, ±0.12 m
Turbidity• 6136 Sensor ETV	0 to 1,000 NTU	0.1 NTU	±2% of reading or 0.3 NTU, whichever is greater‡
Nitrate/nitrogen•••	0 to 200 mg/L-N	0.001 to 1 mg/L-N (range dependent)	±10% of reading or 2 mg/L, whichever is greater
Ammonium/ammonia/ nitrogen•••	0 to 200 mg/L-N	0.001 to 1 mg/L-N (range dependent)	±10% of reading or 2 mg/L, whichever is greater
Chloride•••	0 to 1000 mg/L	0.001 to 1 mg/L (range dependent)	±15% of reading or 5 mg/L, whichever is greater
Chlorophyll• 6025 Sensor ETV	0 to 400 µg/L	0.1 µg/L Chl; 0.1% FS	
Rhodamine•	0-200 µg/L	0.1 µg/L	±5% reading or ±1 µg/L, whichever is greater

• Maximum depth rating for all optical probes is 200 feet, 60.96 m.
••Report outputs of specific conductance (conductivity corrected to 25° C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algorithms found in Standard Methods for the Examination of Water and Wastewater (ed 1989).
•••Freshwater only, Maximum depth rating of 50 feet, 15.2 m.

† Sensor only. Operating temperature of sonde is -5 to 45° C.
‡ In YSI AMCO-AEPA Polymer Standards.

	Range•	Detection Limit•	Linearity•
BGA - Phycocyanin•	0-200,000 cells/mL†	150 cells/mL§	R^2 = 0.9999* R^2 = 0.999**
BGA - Phycoerythrin•	0-200,000 cells/mL‡	400 cells/mL§§	R^2 = 0.99994***

• Maximum depth rating for all optical probes is 200 feet, 60.96 m. Preliminary Specifications.

† Estimated from cultures of *Microcystis aeruginosa*.
‡ Estimated from cultures of PE containing blue-green algae.

§ Estimated from cultures of *Microcystis aeruginosa*.
§§ Estimated from cultures of PE containing blue-green algae.

*Relative to serial dilution of Rhodamine WT (0-400 ug/L).
**Relative to serial dilution of *Microcystis aeruginosa* cultures (0-200,000 cells/mL).
*** Relative to serial dilution of Rhodamine WT (0-8 µg/L).

YSI 6820 V2 & 6920 V2 Sonde Specifications

	6820 V2	6920 V2
Medium	Fresh, sea or polluted water	Fresh, sea or polluted water
Temperature	-5 to +45°C	-5 to +45°C
Communications	RS-232, SDI-12	RS-232, SDI-12
Software	EcoWatch®	EcoWatch®
Dimensions		
Diameter	2.86 in, 7.3 cm	2.85 in, 7.24 cm
Length	13.5 in, 34.3 cm	18 in, 45.7 cm
Weight	3.4 lbs, 2.3 kg	4 lbs, 1.8 kg (batteries installed)
Power	External only, 12 V DC	Internal: 8 AA-size alkaline batteries External: 12 V DC

NEW

YSI 6600 V2 Sonde

With 2 or 4 optical ports and new sensor options

Make the most of your environmental monitoring efforts: The 6600 V2 sonde offers the most comprehensive water quality monitoring package available with simultaneous measurement of conductivity (salinity), temperature, depth or level, pH/ORP. The 6600 V2-4 also measures these parameters: dissolved oxygen, turbidity, chlorophyll, and blue-green algae; the V2-2 measures two of the four parameters simultaneously. Additional calculated parameters include total dissolved solids, resistivity, and specific conductance.

Take advantage of YSI's new optical sensor design and anti-fouling wiper control for improved reliability during extended deployments.

- **Self-cleaning optical sensors with integrated wipers remove biofouling and maintain high data accuracy**
- **Field-replaceable sensors make trips to the field quick**
- **Optimal power management and built-in battery compartment extends *in situ* monitoring periods**

Take Advantage of YSI's New Optical Sensors

In addition to turbidity, chlorophyll, and rhodamine, YSI now offers these optical sensors:

ROX Reliable Optical Dissolved Oxygen

The ROX sensor uses lifetime luminescence detection technology to offer the most reliable oxygen sensor with the lowest possible maintenance effort. The sensor is insensitive to hydrogen sulfide interference and does not require regular membrane changes.

Blue-Green Algae (BGA)

YSI's fluorescence-based blue-green algae sensors will allow you to monitor blue-green algae populations where their presence is a concern. Whether providing an early warning to an algal bloom, tracking taste and odor-causing species in drinking water supplies, or conducting ecosystem research, YSI BGA sensors will provide sensitive and reliable *in situ* data.

Complete Data Record

The YSI 6600 V2-4 Sonde, with 4 optical sensor ports, is the only instrument available to simultaneously measure dissolved oxygen, turbidity, chlorophyll, and blue-green algae!

Pure Data for a Healthy Planet.®

Upgraded sondes for rugged long-term deployment

*Sensor performance verified**

The 6600 V2 sonde uses sensor technology that was verified through the US EPA's Environmental Technology Verification Program (ETV). For information on which sensors were performance-verified, turn this sheet over and look for the ETV logo.

6600 Upgrades Available

YSI is committed to offering our customers reliable and cost-effective water monitoring solutions. To this end, we are offering V2 Upgrades for existing 6600s. Upgrades will be available from YSI Authorized Service Centers and will include the new 6600 V2 bulkhead, a ROX Optical Dissolved Oxygen Sensor, and firmware/software upgrades. In addition, the sonde will be fully tested and calibrated by an experienced YSI service technician.

YSI 6600 V2 Sensor Specifications

	Range	Resolution	Accuracy
ROX™ Optical Dissolved Oxygen• % Saturation	0 to 500%	0.1%	0 to 200%: ±1% of reading or 1% air saturation, whichever is greater; 200 to 500%: ±15% of reading
ROX™ Optical Dissolved Oxygen• mg/L	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.1 mg/L or 1% of reading, whichever is greater; 20 to 50 mg/L: ±15% of reading
Dissolved Oxygen•• % Saturation ETV 6562 Rapid Pulse™ Sensor*	0 to 500%	0.1%	0 to 200%: ±2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading
Dissolved Oxygen•• mg/L ETV 6562 Rapid Pulse™ Sensor*	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.2 mg/L or 2% of reading, whichever is greater; 20 to 50 mg/L: ±6% of reading
Conductivity••• ETV 6560 Sensor*	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range dependent)	±0.5% of reading + 0.001 mS/cm
Salinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature ETV 6560 Sensor*	-5 to +50°C	0.01°C	±0.15°C
pH ETV 6561 Sensor*	0 to 14 units	0.01 unit	±0.2 unit
ORP	-999 to +999 mV	0.1 mV	±20 mV
Depth — Deep	0 to 656 ft, 200 m	0.001 ft, 0.001 m	±1 ft, ±0.3 m
Depth — Medium	0 to 200 ft, 61 m	0.001 ft, 0.001 m	±0.4 ft, ±0.12 m
Depth — Shallow	0 to 30 ft, 9.1 m	0.001 ft, 0.001 m	±0.06 ft, ±0.02 m
Depth — Vented Level	0 to 30 ft, 9.1 m	0.001 ft, 0.001 m	±0.01 ft, 0.003 m
Turbidity• ETV 6136 Sensor*	0 to 1,000 NTU	0.1 NTU	±2% of reading or 0.3 NTU, whichever is greater**
Nitrate/nitrogen••••	0 to 200 mg/L-N	0.001 to 1 mg/L-N (range dependent)	±10% of reading or 2 mg/L, whichever is greater
Ammonium/ammonia/ nitrogen••••	0 to 200 mg/L-N	0.001 to 1 mg/L-N (range dependent)	±10% of reading or 2 mg/L, whichever is greater
Chloride••••	0 to 1000 mg/L	0.001 to 1 mg/L (range dependent)	±15% of reading or 5 mg/L, whichever is greater
Rhodamine•	0-200 µg/L	0.1 µg/L	±5% reading or 1 µg/L, whichever is greater

• Maximum depth rating for all optical probes is 200 feet, 61 m. Turbidity and Rhodamine are also available in a Deep Depth option (0 to 200 m).
•• Rapid Pulse is only available on 6600 V2-2 (two optical ports version).
••• Report outputs of specific conductance (conductivity corrected to 25° C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algorithms found in *Standard Methods for the Examination of Water and Wastewater* (ed 1989).
•••• Freshwater only. Maximum depth rating of 50 feet, 15.2 m. 6600 V2-2 has 3 ISE ports; not available on the 6600V2-4.

**In YSI AMCO-AEPA Polymer Standards.

	Range	Detection Limit	Resolution	Linearity
Blue-Green Algae Phycocyanin•	~0 to 280,000 cells/mL† 0 to 100 RFU	~220 cells/mL§	1 cell/mL 0.1 RFU	$R^2 > 0.9999$**
Blue-Green Algae Phycoerythrin•	~0 to 200,000 cells/mL† 0 to 100 RFU	~450 cells/mL§§	1 cell/mL 0.1 RFU	$R^2 > 0.9999$***
Chlorophyll• ETV 6025 Sensor*	~0 to 400 µg/L 0 to 100 RFU	~0.1 µg/L§§§	0.1 µg/L Chl 0.1% RFU	$R^2 > 0.9999$****

• Maximum depth rating for all optical probes is 200 feet, 61 m. Also available in a Deep Depth option (0 to 200 m).
RFU = Relative Fluorescence Units

† Explanation of Ranges can be found in the 'Principles of Operation' section of the 6-Series Manual, Rev D.

§ Estimated from cultures of *Microcystis aeruginosa*.
§§ Estimated from cultures *Synechococcus sp.*
§§§ Determined from cultures of *Isochrysis sp.* and chlorophyll *a* concentration determined via extractions.

**For serial dilution of Rhodamine WT (0-400 ug/L).
***For serial dilution of Rhodamine WT (0-8 µg/L).
****For serial dilution of Rhodamine WT (0-500 ug/L).

YSI 6600 V2 Sonde Specifications

Medium		Fresh, sea or polluted water	Software		EcoWatch®
Temperature	Operating	-5 to +50°C	Dimensions	Diameter	3.5 in, 8.9 cm
	Storage	-10 to +60°C		Length, no depth	19.6 in, 49.8 cm
				Length, with depth	21.6 in, 54.9 cm
				Weight	7 lbs, 3.18 kg (batteries installed, with depth)
Communications		RS-232, SDI-12	Power	External	12 V DC
				Internal	8 C-size alkaline batteries

YSI Environmental NEW

6600 EDS Extended Deployment System

Measure over 10 parameters in severe fouling environments

Figure 1. *Profile of the new 6600 EDS depicting (clockwise from bottom-right), Rapid Pulse™ dissolved oxygen sensor, chlorophyll, pH/ORP, and turbidity, all of which are maintained free of fouling by the universal wiper assembly, as well as individual optical wipers.*

Figure 2. *A prototype 6600 EDS after continuous deployment for 80 days in Buzzards Bay, MA. The sensor in the foreground is the active DO sensor. The sensor at top-right was used as a non-wiped fouling reference. Note extensive fouling by plant and animal species on the non-wiped sensor.*

Pure Data for a Healthy Planet.™

Compatible with EcoWatch™ for Windows® software

Building upon the unprecedented accuracy and reliability of YSI's ***stirring-independent***Rapid Pulse™ dissolved oxygen system, as well as on the improved and proven wiped turbidity sensor, YSI has produced the YSI 6600 EDS (Extended Deployment System).

- **Provides unprecedented DO accuracy and longevity in aggressive fouling environments**
- **Wiped fouling protection for turbidity, chlorophyll, DO, pH, and ORP sensors**
- **Ideal for extended, long-term deployments**
- **Virtually maintenance free**
- **Sensors are field-replaceable**
- **Integrates with DCPs**

Initial field studies of the YSI 6600 EDS indicate that the system provides unprecedented DO accuracy and longevity in aggressive fouling environments. The 6600 EDS was inspected after 80 days of an ongoing deployment performance evaluation *(see Fig. 2)*. The Rapid Pulse™ DO sensor performed within specifications throughout this deployment ***without*** the need for recalibration or cleaning. During this deployment, the instrument was removed once for battery replacement; none of the sensors were cleaned or recalibrated.

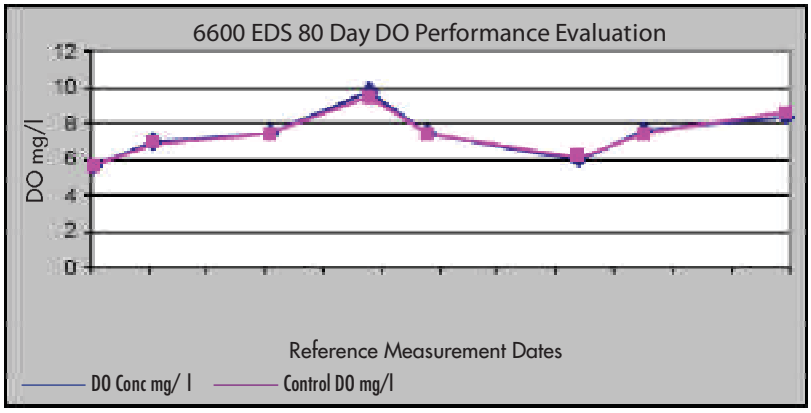


Figure 3. *Remarkably close agreement (mean error 0.16mg/l) between the continuously deployed sonde and the control measurements was observed throughout an 80-day deployment.*

HOSKIN SCIENTIFIC

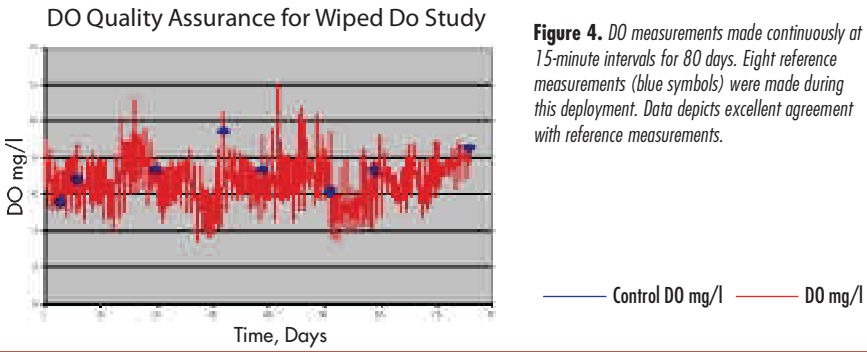


Figure 4. *DO measurements made continuously at 15-minute intervals for 80 days. Eight reference measurements (blue symbols) were made during this deployment. Data depicts excellent agreement with reference measurements.*

YSI 6600 EDS (Extended Deployment System)

Dissolved Oxygen % Saturation	Range Resolution Accuracy	0 to 500% 0.1% 0 to 200%: ±2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading
Dissolved Oxygen mg/L	Range Resolution Accuracy	0 to 50 mg/L 0.01 mg/L 0 to 20 mg/L: ±2% of reading or 0.2 mg/L, whichever is greater; 20 to 50 mg/L: ±6% of reading
Conductivity †	Range Resolution Accuracy	0 to 100 mS/cm 0.001 to 0.1 mS/cm (range-dependent) ±0.5% of reading + 0.001 mS/cm
Temperature	Range Resolution Accuracy	-5 to +45°C 0.01°C ±0.15°C
pH	Range Resolution Accuracy	0 to 14 units 0.01 unit ±0.2 unit
ORP	Range Resolution Accuracy	-999 to +999 mV 0.1 mV ±20 mV
Salinity	Range Resolution Accuracy	0 to 70 ppt 0.01 ppt ±1% of reading or 0.1 ppt, whichever is greater
Shallow Depth	Range Resolution Accuracy	0 to 30 feet (0 to 9 m) 0.001 feet (0.001 m) ±0.06 feet (±0.02 m)
Medium Depth	Range Resolution Accuracy	0 to 200 feet (0 to 61 m) 0.001 feet (0.001 m) ±0.4 feet (±0.12 m)
Deep Depth	Range Resolution Accuracy	0 to 656 feet (0 to 200 m) 0.001 feet (0.001 m) ±1 feet (±0.3 m)
Vented Level	Range Resolution Accuracy	0 to 30 feet (0 to 9 m) 0.001 feet (0.0003 m) ±0.01 feet (0.003 m)
Turbidity	Range Resolution Accuracy Depth	0 to 1,000 NTU 0.1 NTU ±5% of reading or 2 NTU, whichever is greater 200 feet (60.96 m)
Chlorophyll	Range Resolution Depth	0 to 400 µg/L 0.1 µg/L Chl; 0.1%FS 200 feet (60.96 m)

† Report outputs of specific conductance (conductivity corrected to 25° C), resistivity, and total dissolved solids are also provided. These values are automatically calculated from conductivity according to algorithms found in Standard Methods for the Examination of Water and Wastewater (ed 1989).

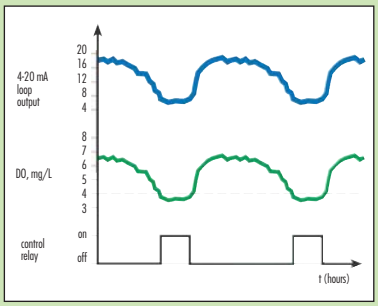
YSI 6500 Monitoring System

Compact, multiparameter water quality system provides continuous data to improve the efficiency of operations

Control the readout and mode of operation

Make the characters small and read all the parameters simultaneously. Or use larger, easy-to-read characters and view the parameters two at a time.

Loop output for transmitting data to trigger alarms



The 4 to 20 mA loop output lets you transmit data; the control relays activate alarms and phone dialers. The graph shows the control relay being activated when the dissolved oxygen drops below 4 mg/L.

Five ways you'll stay one step ahead

1. Continuously monitor DO, conductivity, temperature, pH

By providing uninterrupted data, the YSI 6500 connected to a YSI 6-Series sonde is a cost-effective alternative for water quality monitoring. Replacing multiple instruments, it reduces labor needs for both installation and operation.

2. Eight scalable 4-20 mA current loop channels

Monitor up to eight parameters with settable high and low limits. You can integrate the YSI 6500 with SCADA or plant control systems, and chart recorders.

3. Four SPDT relays

You define the setpoints for four parameters. Readings beyond your setpoints trigger alarms or phone dialers.

4. Choose the calibration method you prefer

With calibration data stored in the sonde and built-in software, the YSI 6500 lets you calibrate in the field and the lab.

Easily calibrate the sensors with your PC and EcoWatch® software (included) in the lab, where variables are more easily controlled and you're out of the weather.

In the field, calibrate the DO sensor in air or use a YSI portable oxygen meter (like the YSI 55) to determine calibration values; use standard solutions to calibrate the pH and conductivity probes.

In the field, you can calibrate with the YSI 6500 Monitor itself, a YSI 650 multiparameter display system, an Isco sampler or a laptop computer.

5. Versatile YSI 600R adds flexibility to your operation

The YSI 600r can be used independently for other applications, such as stream sampling with a YSI 650 multiparameter display system; or it can interface with an automatic sampler or flow meter.

The YSI 600r uses our Rapid Pulse™ oxygen sensor (no stirring required) and the pH reference probe is replaceable.

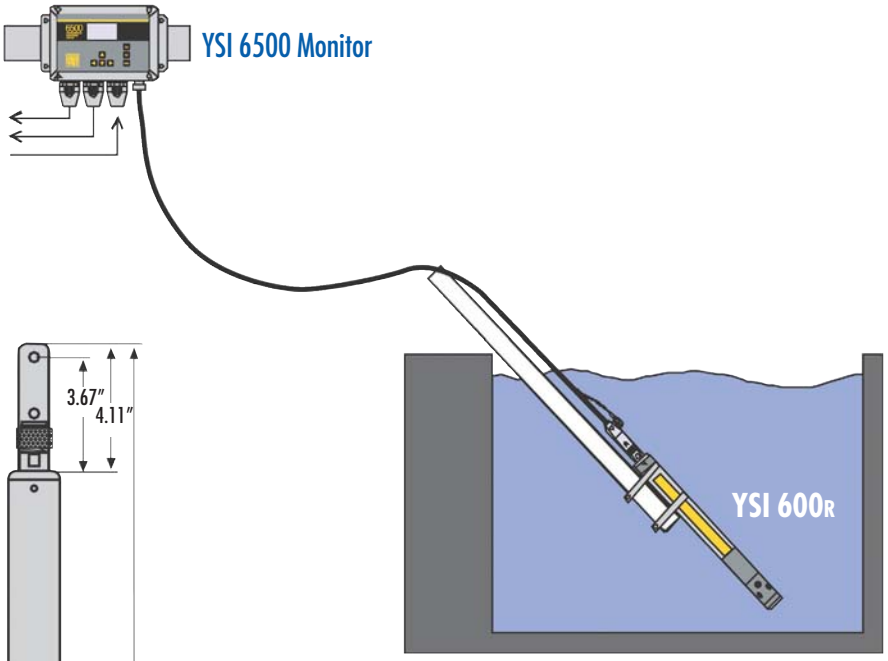
System Components

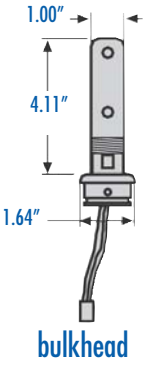
Typical installations

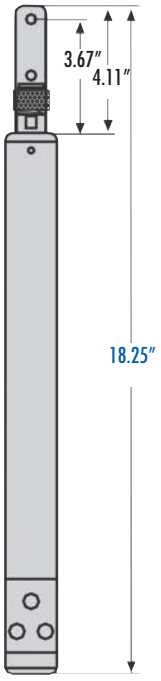
The drawing at the right shows a YSI 600r sonde connected to a YSI 6500 monitor with a 25-foot YSI 6091 cable.

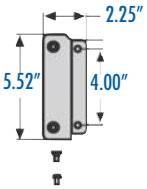
If you want to install the monitor more than 25 feet from the sonde, you must use a YSI 6502 breakout box in addition to your own junction box and cable.

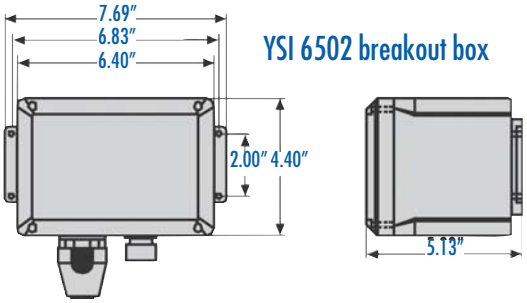
The drawings below are the system components.

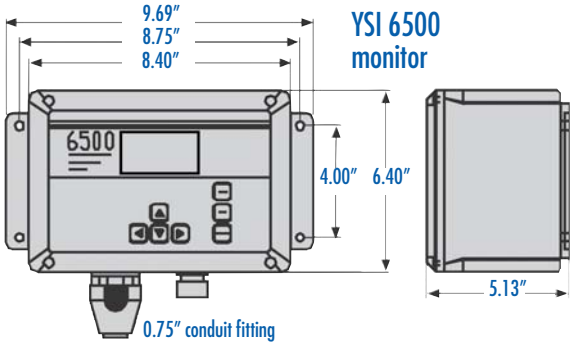


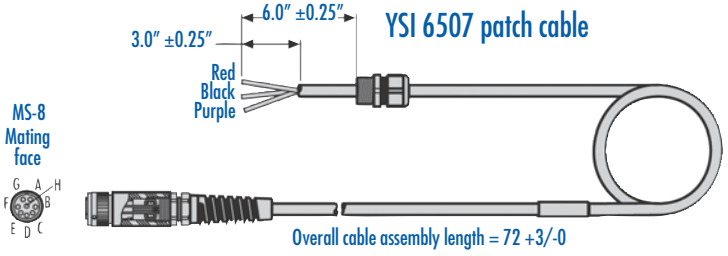


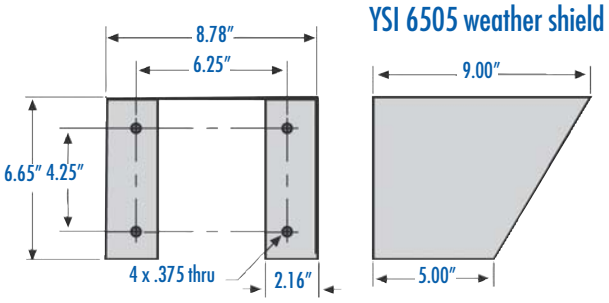


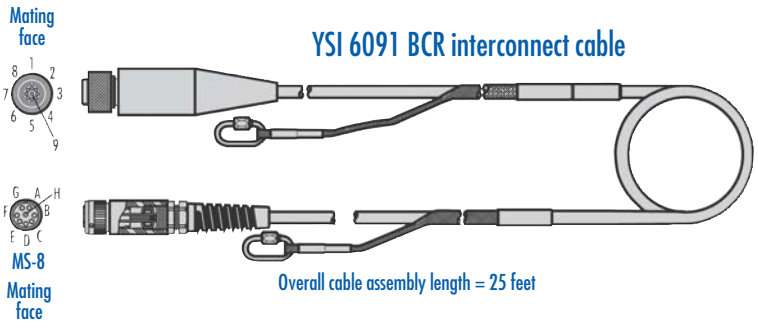












YSI 6500 Specifications

Operating Temperature	-20 to +60˚C (-4 to +140˚F)
Enclosure Rating	NEMA 4X
Line Power (nominal)	100 to 240 V AC, 50-60 Hz
Maximum Power Draw	45 watts
Control Relay Outputs	Rated 5 amps at 240 V AC
4 to 20 mA Loops	Class L, 0 to 300 ohms (250 ohms typical)
4 to 20 mA Output Accuracy	±0.08 mA (electrically isolated from sensors)
Electrical Safety	UL, CUL, and CE approved
Pollution Degree	II per UL3101
Installation Category	III per UL3101

YSI 600R Sensor Specifications

	Range	Resolution	Accuracy
Dissolved Oxygen % Saturation Rapid Pulse™ Sensor	0 to 500%	0.1%	0 to 200%: ±2% of reading or 2% air saturation, whichever is greater; 200 to 500%: ±6% of reading
Dissolved Oxygen mg/L Rapid Pulse™ Sensor	0 to 50 mg/L	0.01 mg/L	0 to 20 mg/L: ± 0.2 mg/L or 2% of reading, whichever is greater; 20 to 50 mg/L: ±6% of reading
Conductivity••	0 to 100 mS/cm	0.001 to 0.1 mS/cm (range dependent)	±0.5% of reading + 0.001 mS/cm
Salinity	0 to 70 ppt	0.01 ppt	±1% of reading or 0.1 ppt, whichever is greater
Temperature	-5 to +50°C	0.01°C	±0.15°C
pH	0 to 14 units	0.01 unit	±0.2 unit

YSI 600R Sonde Specifications

Medium	Fresh, sea or polluted water	Software	EcoWatch®
Temperature	-5 to +50°C	Dimensions Diameter Length Weight	 1.65 in, 4.2 cm 14.8 in, 37.5 cm 1.10 lbs, 0.50 kg
Communications	RS-232, SDI-12	Power	External 12 V DC

6-Series Anti-Fouling Kits

System Inhibits Biofouling to Lengthen Deployment Times and Reduce Operating Costs

YSI's Anti-fouling Kits, designed for 6-Series Sondes, are reliable and affordable ways to significantly lengthen deployment times, reduce operating costs, and ensure high quality data for continuously deployed monitoring systems.

YSI 6600 sonde with installed anti-fouling kit

The system complements the existing 6-Series wipers/brushes and uses copper alloys to provide optimal anti-fouling characteristics and long-term durability. The kits also use an environmentally safe, nanopolymer spray to keep non-wiped surfaces slick and challenging for biofouling settlement.

The Anti-fouling Kits will lengthen deployments that are impacted by biofouling by two to five times—or longer, depending on the environment. This means you can reduce expensive maintenance trips to the field by 2-5 times, a major savings in operating costs. With the Anti-fouling Kits installed, cleaning the sonde is much easier and the chance of damage during cleaning is much less.

- **Optimize data return from remote monitoring sites**
- **Lower the cost of long-term deployments by 2-5x**
- **200 meter depth rating for all Anti-Fouling Optical Probes**
- **Easy instrument cleaning with lower risk of sensor damage**

The kit components are sold separately, so you can order the parts you need for a specific sonde. *Refer to back page for list of all components.*

Pure Data for a Healthy Planet.®

Anti-fouling materials were tested by YSI for two years at nine different sites representing a variety of freshwater and marine environments. In these challenging biofouling conditions, the materials which exhibited the best performance relative to durability and anti-fouling properties were selected for the anti-fouling kits.

Photo courtesy of Stephanie Hess, King County

(Right) YSI sonde with anti-fouling kit after 30 days deployed in a high biofouling environment. The copper anti-fouling kit significantly slowed the growth of aquatic organisms on the sensors.

Optical Sensors, clockwise from bottom left: 6450, 6431,6425,and 6436

Anti-fouling Wiper

6155 Membrane Kit

2166 Copper Screens

C-Spray Solution

6175 Copper Sonde Guard

6189 Copper Tape

6151 Port Plug

How to Order Anti-fouling Parts

Category	Item Number	Description
Optical Sensors	616425	**Anti-fouling Chlorophyll Probe.** Includes probe with copper-alloy housing, lock nut, wiper block, and wiper kit. Rated to 200 meter depth.
	616431	**Anti-fouling Blue-green Algae-Phycocyanin Probe.** Includes probe with copper-alloy housing, lock nut, wiper block, and wiper kit. Rated to 200 meter depth.
	616432	**Anti-fouling Blue-green Algae-Phycoerythrin Probe.** Includes probe with copper-alloy housing, lock nut, wiper block, and wiper kit. Rated to 200 meter depth.
	616436	**Anti-fouling Turbidity Probe.** Includes probe with copper-alloy housing, lock nut, wiper block, and wiper kit. Rated to 200 meter depth.
	616450	**Anti-fouling ROX Dissolved Oxygen Probe.** Includes probe with copper-alloy housing, lock nut, wiper block, and wiper kit. Rated to 200 meter depth.
Wipers for Sensors	616625*	**6625AF Anti-fouling Wiper Kit for YSI optical sensors.**** Includes two wiper assemblies (copper-alloy wiper block, larger pad, and setscrew), hex wrench, and instructions. (Does not include sensor.)
	616630*	**6330AF Anti-fouling Wiper/Brush Kit for 6600EDS sonde.** Includes two wiper assemblies (copper-alloy wiper/brush assembly, larger pad, and setscrew), hex wrench, and instructions. (Does not include sensor.)
	616445*	**6445AF Anti-fouling Wiper/Brush Kit for 6600V2-4 sonde.** Includes two wiper assemblies (copper-alloy wiper/brush assembly, larger pad, and setscrew), hex wrench, and instructions. (Does not include sensor.)
Membrane	606155	**6155 Optical DO Membrane Kit** for 6450 DO Probe. Includes copper-alloy replacement membrane, lock nuts, hex wrench, and instructions. (Does not include sensor.)
Screen for Sensors	202166	**Copper-mesh screens.** Includes two pre-formed, anti-fouling/animal blocking screens for 6560 Conductivity/Temperature Probe and 6561 pH Probe.
Nanopolymer Solution	C-Spray	**C-Spray Protective Probe Solution** for 6560 Conductivity/Temperature Probe and other components. 100 mL bottle.
Guards	616145	**Copper-alloy sonde guard for 6600 sondes**
	616176	**Copper-alloy sonde guard for 6820/6920 sondes**
	616175	**Copper-alloy sonde guard for 600OMS sonde** (long length)
Tape	616189	**Roll of anti-fouling copper tape**. 2 in. wide x 16 ft. long (5 mm x 4.8 m). Adhesive backed. Apply to 6560 Conductivity/Temperature Probe, 6561 pH Probe, and other probes. ~230 applications. Lasts ~4-6 weeks in water.
Port Plugs	616151	**Copper-alloy optical probe port plug**
	616161	**Copper-alloy pH probe port plug**
	616171	**Copper-alloy ISE probe port plug**

** Proper use of the anti-fouling wipers requires the latest version of 6-Series sonde firmware (3.06 or later).*

*** For a YSI 6600V2-4 sonde with wiped pH/ORP probe, purchase one 616445 wiper/brush assembly plus 616625 wipers for your remaining optical sensors. For a YSI 6600EDS sonde, purchase one 616630 wiper/brush assembly plus 616625 wipers for your remaining optical sensors.*

Oil in Water Sensor Adapter Kit

Add Hydrocarbon Sensing to Existing Water Quality Sondes and AUVs

YSI 6600 water quality sonde with adapted Turner hydrocarbon sensor monitors oil in polluted waters, shipping channels, and mines

The YSI Sensor Adapter expands water quality monitoring to include third-party analog output sensors. In addition to monitoring for the standard water quality parameters of Temperature, Conductivity, pH, Dissolved Oxygen, Turbidity, Blue-Green Algae, and Chlorophyll, 6-Series customers can now measure hydrocarbons and other parameters from the Turner Cyclops-7® submersible sensor line.

Hydrocarbon monitoring in water is of growing importance near oil platforms, marinas, and spill-affected waters. The stand-alone Turner sensors have been used in the coastal industry to detect hydrocarbons. The crude oil sensor is useful for detecting oil throughout the water column in offshore monitoring. Closer to shore, where CDOM interference is likely, the refined fuels sensor has a built-in rejection filter to maximize signal response.

By plugging the sensor adapter into an optical port on a YSI sonde, hydrocarbons can be added to water quality parameters in profiling or continuous monitoring applications. Because the Turner probe is seamlessly integrated into the YSI sensor suite, hydrocarbon data are logged and transmitted along with water quality data.

Advantages

Field Upgradable: The Sensor Adapter Kit can be quickly installed onto existing YSI sondes that may already be deployed. It provides the lowest-cost solution to adding oil monitoring capability to current monitoring locations.

No Wiring: No new wiring or external datalogger required. The YSI sonde supplies power and logs data to its internal memory. If the sonde is already connected to a data logger, then the logger program will only require a slight change to accept additional output parameters over SDI-12.

CDOM Rejection: Separating the oil signal from naturally occurring Colored Dissolved Organic Matter is a strength of the Turner probes, which give the maximum signal with minimal interference. A C7 CDOM sensor can also be added if another sensor adapter is purchased.

Compatibility

The Sensor Adapter Kit will quickly fit any YSI 6600 sonde. Other YSI sondes, like the 6920, 6820, and OMS, will require external power and a customized sensor guard and calibration cup. All sondes must have been manufactured after 2002. The Sensor Adapter Kit is compatible with YSI's EMM68 rapid deployment harbor buoy.

Note: The overall sonde length is extended by approximately 5 inches when the adapter and hydrocarbon sensor are installed. Therefore, the pH wiper system and anti-fouling guard will not fit with this configuration. Contact YSI's Integrated Systems division for a quote on special fabrications.

Oil in Water Sensor Adapter Kit Includes:

Adapter	202400	YSI-Turner C7 Adapter Module with sonde interface connector, wet-pluggable C7 connector, and microprocessor controller
Sensors	202401 202402 202403	One of the following Turner sensor options: Refined fuels sensor for coastal monitoring Crude oil sensor for open ocean monitoring CDOM sensor for coastal monitoring
Accessories	202414 202415	Extended 14 in. plastic sensor guard without bottom plate Extended transport and calibration cup without endcap and gasket
Firmware		Firmware upgrade to add auxiliary ports 1 and 2 parameter selection in the Sensor Menu, and millivolts and engineering units in the Report Menu
Instructions	202416	Installation and calibration instructions

Sensor Specifications:

Near-Shore Refined Fuels Sensor with CDOM Rejection

Min. Detection Limit	2 ppb NS (1.5 Napthalene Disulfonic Disodium Salt)
Range	0-10,000 ppb NS (1.5 Napthalene Disulfonic Disodium Salt)
Sensor Output (AUX)	0-5 V
Linearity	0.99 R^2
Depth	61 meters
Temperature Range	0-50 deg C

Open-Water Crude Oil Detection Sensor

Min. Detection Limit	0.2 ppb QS (Quinine Sulfate)
Range	0-1,500 ppb QS (Quinine Sulfate)
Sensor Output (Aux)	0-5 VDC
Linearity	0.99 R^2
Depth	61 meters
Temperature Range	0-50 deg C

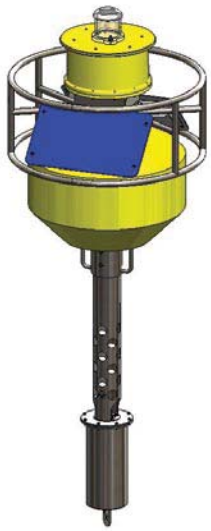
CDOM Sensor

Min. Detection Limit	0.4 ppb QS (Quinine Sulfate)
Range	0-2,500 ppb QS (Quinine Sulfate)
Sensor Output (Aux)	0-5 VDC
Linearity	0.99 R^2
Depth	61 meters
Temperature Range	0-50 deg C

EMM68 Buoy

Quick and Easy Access to Water Quality Data

The EMM68 buoy is lightweight and easy to deploy from shore or small boat



EMM68 buoy supports a single water quality instrument, such as a YSI 6600 V2-4 sonde, positioned inside the subsurface pipe

The EMM68 buoy provides a quickly deployable water quality monitoring platform with remote telemetry. The system can be lifted into place by two people, reducing deployment and maintenance costs—while maintaining a secure buoy that is difficult steal or vandalize. And the entire system can be installed without divers, allowing for complete serviceability from a small boat or watercraft.

Collect data in waters previously out of reach. The EMM68 buoy is an economical alternative to obtaining site access to install permanent fixtures on bridge pilings and piers.

Receive remote data

Two data delivery systems are available to send data from any YSI sonde. Basic data delivery sends a raw data file to your computer, while the web-enabled option posts data directly to a public or private web site.

Advantages of remote data delivery:

- Save you unnecessary trips into the field, reducing operating costs
- Make you aware of changing conditions as they occur, improving response time
- Match your calibration and maintenance schedules to actual sensor performance, reducing consumables

Ideal for monitoring in these applications

- Baseline studies
- Construction and dredging
- Dye-tracing studies
- Emergency response
- Fisheries
- Industrial sites
- Non-point source/TMDL
- Point source/discharge
- Stormwater & CSO
- Source water
- University/research

Custom systems available

Contact YSI's Integrated Systems & Services division to discuss your specific monitoring application. We offer a variety of buoy platforms which can be tailored to fit your needs. Our other systems are suited for deployment in high-energy environments and for long-term monitoring projects.

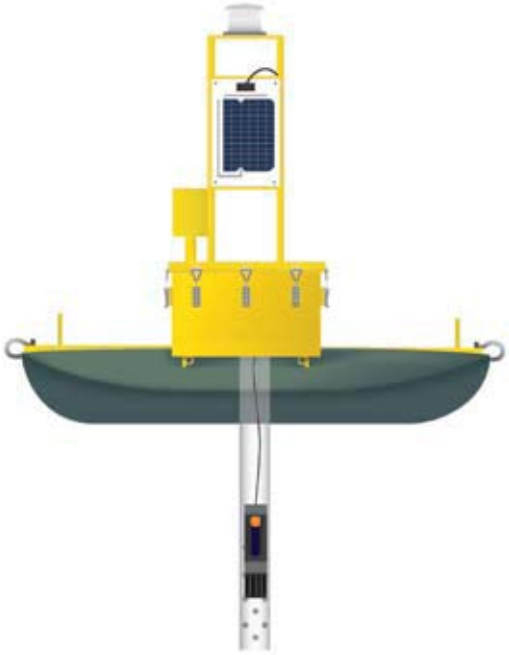
EMM68 Buoy Specifications	
Weight	48 kg (105 lbs) in air
Mooring	Customer-supplied single- or two-point
Antenna	Integral cellular antenna standard; waterproof external antenna optional
Solar	2 x 10-watt panels
Battery	12 v/24 amp-hr
Float	Impact-resistant polyurethane, foam-filled
Sensor Payload	Any YSI 6-Series water quality sonde (can include temperature, depth, conductivity, blue-green algae, chlorophyll, dissolved oxygen, ORP, pH, rhodamine, and turbidity)
Software	One copy of base-station software required for entire monitoring network; priced separately
Telemetry	CDMA through Verizon®, GSM circuit-switched data, or GPRS (customer specifies coverage and signal strength at site when ordering)
Beacon	Flashing amber; optional
Deployment	Min. water depth 1.8 meters; max. operational currents 2 knots; max. rolling wave height 1 meter

Simple Steps to Deploy a Buoy

- Activate cellular modem and account
- Install base station software on computer with unrestricted internet access
- Configure YSI sonde with EcoWatch® software
- Test communications in lab
- Source and install mooring lines and weights
- Deploy buoy in safe location
- Maintain sensors and equipment on a regular basis

EMM350 PISCES Platform

Pontoon for In-situ Characterization of Environmental Systems



Pure Data for a Healthy Planet.®

Easily movable monitoring platform for navigable waterways

The PISCES is a lightweight pontoon platform which supports water quality, water velocity, and meteorological sensors as well as computer logging systems. The platform holds two topside aluminum chests that house the data acquisition system, cellular modem, and battery. The chests are easily serviceable from the water and accommodate multiple underwater cable connections.

The PISCES platform is ideal for coastal, estuary, river, and lake monitoring. It can be deployed by two persons with a truck and a small boat. The platform provides several instrument array options as well as several data acquisitions products.

Features include:

- Towable by most small vessels
- Ideal for high currents up to 12 knots
- Loading and deployment by two persons
- Standard configurations available with short lead time
- High profile for visibility in navigable waterways
- Abundant power reserve and solar accumulation
- Datalogger, cellular modem, meteorological sensors, and ADP configurations
- Sonde standpipe is retractable for transportation and towing
- Also available in flow-through cell configuration with option for multiple-depth sampling
- Optional: Unicellular foam-filled pontoons for puncture protection

Custom systems available

Contact YSI's Integrated Systems & Services division to discuss your specific monitoring application. We offer a variety of buoy platforms which can be tailored to fit your needs.

The PISCES is deployed with one- or two-point mooring, making it stable even in wind-driven surface chop.

EMM350 Specifications		
Hull		Polyethylene, with optional closed-cell, foam-filled pontoons
Weight		160 lbs.; with payload 230 lbs.
Shape		Catamaran
Dimensions	Height	70 in.
	Length	75 in.
	Width	48 in.
Mooring Attachment		One- or two-point attachment points
Frame		6061 marine-grade, powder-coated aluminum
Tripod		6061 marine-grade, powder-coated aluminum
Hardware		316 stainless steel
Antenna		3 db. gain omni low profile
Beacon		Solid-state LED strobe
Sonde Tube		Retractable, 4 in. schedule 40 PVC pipe with schedule 80 flange

Left: EMM350 is designed to fit between the wheel wells of a full-size pickup truck.

The EMM350 is easy to deploy for moni - toring around construction, dredging, and other applications.

vertical profiling
for continuous monitoring

Simultaneously monitor water quality, water velocity, and meteorological data 24/7 with an automated Vertical Profiling System, the most comprehensive environmental monitoring system available.

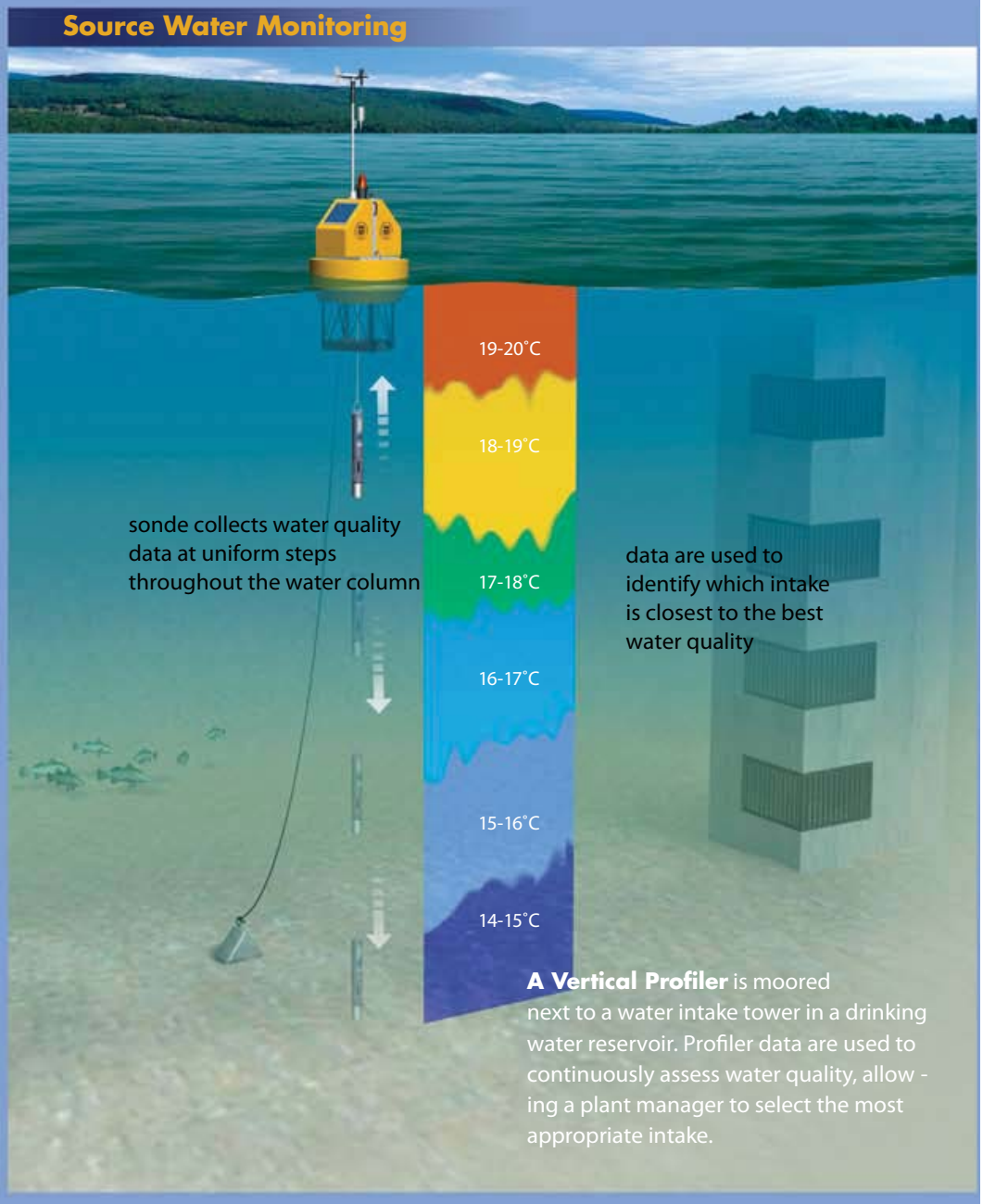
Why Profile?

Water quality assessment is best conducted through a **complete time series** that monitors physical, chemical, and biological parameters.

YSI's automated Vertical Profiler offers further advancements by **sampling at different depths, allowing you to monitor an entire water column.**

Variations in temperature, wind, rainfall, salinity, and flow cause changes in the vertical structure of a water column, varying from highly stratified to well-mixed.

Users who apply data from a Vertical Profiler will see the impacts of the physical environment on their water resources—**without frequent trips to the field.**



A Vertical Profiler is moored next to a water intake tower in a drinking water reservoir. Profiler data are used to continuously assess water quality, allowing a plant manager to select the most appropriate intake.

Vertical Profiling Systems

Comprised of three components: **1)** a floating or fixed mounting platform, **2)** a profiling package composed of a controller, winch, data logging and telemetry system, and meteorological sensor suite (optional), and **3)** an underwater sensor package that typically includes a YSI 6-Series water quality sonde and other sensors upon request.

YSI 6950 Fixed Profiling System can be attached to any fixed structure such as a bridge or pier

YSI 6951 Pontoon-Mounted Profiling System with meteorological package provides a stable work surface and easy-to-deploy design for low-energy environments

YSI 6952 Buoy-Based Profiling System for high-energy environments

Anti-fouling technology

Integrated wipers and new copper-alloy Anti-Fouling Kits for YSI sensors prevent the growth of biofouling, prolong maintenance intervals, lower operating costs, and improve reliability.

Adjust profile steps

As water levels fluctuate, data from optional fixed reference sonde or optional depth sounder automatically compensate for the changes. Alternately, a 50-point table entry may be used.

Vertical Profiling System Specifications	
Minimum Profile Depth	1 meter
Maximum Profile Depth	100 meters
Depth Profile Setpoint Accuracy	±0.1 meter (±0.2 meter for fixed reference)
Recommended/Min. Step Size	1 meter/0.5 meter
Maximum Profile Frequency	~50% of duty cycle
Sensor Options	Water Quality: Conductivity, temperature, depth, dissolved oxygen, pH/ORP, turbidity, chlorophyll *a*, blue-green algae, PAR, and velocity Meteorological: Wind speed and direction, barometric pressure, rainfall, relative humidity, light, and air temperature
Sensor Step Modes	Table entry (50 steps max.) or computed
Power Requirement	12 VDC 18Ah (fixed), 120/240 VAC (fixed), 12 VDC 95Ah (floating)
Cable Options	15 meter vented, 50 meter, or 100 meter

The CastAway™-CTD

with profiling and analysis software

CastAway CTD

The CastAway-CTD
Instant, reliable data in the palm of your hand!

The YSI CastAway-CTD is a lightweight, easy to use hydrographic instrument designed for quick and accurate conductivity, temperature, and depth profiles. Starting with a unique six-electrode array and a flow-through cell, the CastAway makes use of commercial Bluetooth and GPS technology to make an instrument that is as usable as it is accurate.

The CastAway is a multi-functional tool that incorporates the most modern technology available - yet is simple to use. It is designed for CTD profiling down to 100 m and is easy to deploy.

The palm-sized CastAway-CTD can easily be deployed by hand. Each cast is referenced with both time and location using its built-in GPS receiver. Latitude and longitude are acquired both before and after each profile. Plots of conductivity, temperature, salinity and sound speed versus depth can be viewed immediately on the CastAway's integrated color LCD screen in the field.

Raw data can be easily downloaded via Bluetooth to a Windows computer for detailed analysis and/or export at any time. Rugged, non-corrosive housing, AA battery power and tool-free operation reflect the technician-friendly pedigree of the CastAway-CTD. So do the simple, intuitive features – everything an operator needs to know about deploying the CastAway-CTD, viewing data and downloading the files fits in the lunchbox-sized carrying case.

Best used in:

- Coastal Oceanography
- Hydrology
- Aquaculture/Fisheries

When needed for:

- Saltwater Intrusion
- Surveying/Hydrography
- Sound Velocity Profiles
- Field Sensor Verification
- Estuarine Research

- *GPS position, date and time*
- *Fast sampling and sensor response*
- *Waterproof interface works in and out of the water*
- *Bluetooth wireless communication*
- *No user calibration required*
- *No tools, computers or cables required!*

HOSKIN SCIENTIFIC

Specifications

Memory 15 MB (750+ casts based on typical usage)

Communications Bluetooth class II, up to 10 m range

Power 2 "AA" alkaline batteries, 40 hours continuous use

Data Output Format
- ASCII (CSV)
-Hypack
-Matlab

Environmental
- Depth range: 0-100 m
- Use temperature: -5° to 45° C
- Storage temperature: -10° to 50° C

Sampling Modes
- Casting (up/down)
- Point sample (moving the unit back and forth)

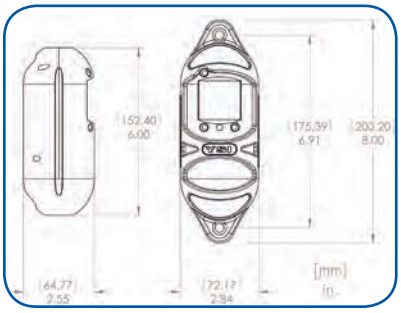
Software
- Windows XP/Vista/7
- Geo-referenced
- Multi-language
- Data plots, filtering, import/export

Accessories
- Hard plastic storage/shipping case
- Polyurethane jacket
- 15m deployment line
- Bluetooth dongle
- Two locking carabiners
- Three magnetic stylus pens
- Cleaning brush

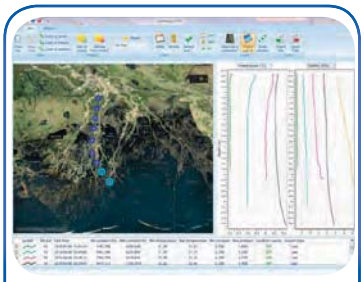
Thermistor Response Less than 200 ms

Sampling Rate 5 Hz

Weight In air: 1.0 lb (0.45 kg)
In water: 0.06 lbs (0.03 kg)



Simple "AA" battery installation and storage area for spare stylus.



A screen capture of data from a river delta in Louisiana acquired using a CastAway-CTD. The technicians collected 21 casts in less than 3.5 hours.

Each CastAway ships in this hard plastic kit, complete with accessories and quick start guide.

The CastAway-CTD Output Parameters

	Range	Resolution	Accuracy	Measured or Derived
Conductivity	0 to 100,000 µS/cm	1µS/cm	± 0.25% ± 5 µS/cm	Measured
Temperature	-5° - 45° C	0.01° C	± 0.05° C	Measured
Pressure	0 to 100 dBar	0.01 dBar	± 0.25% FS	Measured
Salinity	Up to 42 (PSS-78)	0.01 (PSS-78)	± 0.1 (PSS-78)	PSS-78[3]
Sound Speed	1400 - 1730 m/s	0.01 m/s	± 0.15 m/s	Chen-Millero[4]
Density[1]	990 to 1035 kg/m^3	0.004 kg/m^3	± 0.02 kg/m^3	EOS80[5]
Depth	0 to 100 m	0.01m	± 0.25% FS	EOS80[5]
Specific Conductivity[2]	0 to 250,000 µS/cm	1µS/cm	± 0.25% ±5 µS/cm	EOS80[5]
GPS			10 m	

[1]Based on temperature resolution and accuracy.
[2]Based on 100,000 µS/cm at -5° C.
[3]1978 Practical Salinity Scale.
[4]Chen-Millero, 1977. Speed-of-sound in sea water at high pressures.
[5]International Equation of State for sea water (EOS-80).

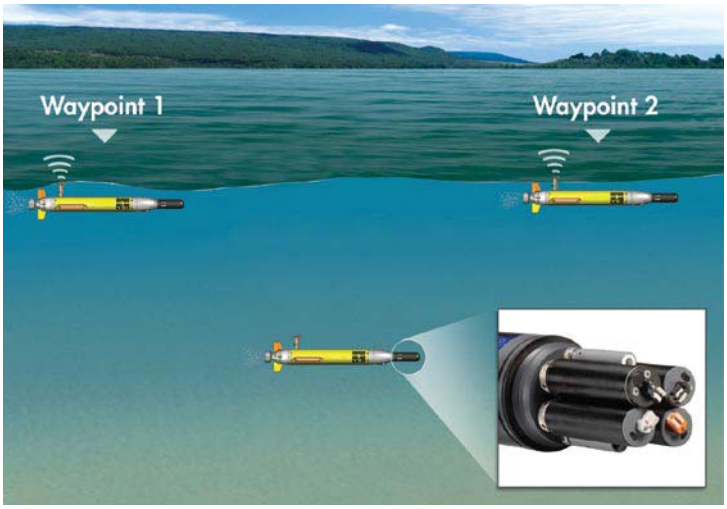
NEW

ECOMAPPER AUV

Generate High-Resolution Maps of Water Quality and Bathymetry

YSI introduces a unique system for collecting water quality data. The EcoMapper™ AUV (Autonomous Underwater Vehicle) with YSI's 6-Series sensors will provide researchers and scientists with a data collection platform unmatched in its flexibility and capability. This vehicle can measure up to 10 water quality parameters at a continuous interval for missions up to 10 hours long.

- **Underwater vehicle is easily deployed by one person**
- **Wide-area survey without a workboat or associated staff**
- **Intuitive mission planning software for quick and easy survey design and execution**
- **Undulation through the water column provides data in both the horizontal and vertical planes**
- **Geo-referenced data**
- **Proven YSI sensor technology**



Once deployed, the EcoMapper communicates with a Wi-Fi box while on the surface (up to 200 m) and acquires a GPS fix at waypoints identified in the mission plan.

Between waypoints, the EcoMapper dives to a specified depth and dead reckons to the next waypoint.

EcoMapper Platform

- Robust and simple to use – minimal operator training
- Low cost of ownership – purchase, maintain, repair, modify
- Bow with integrated sensor package includes YSI's sensor bulkhead, depth sounder, and PAR ports
- Rugged, lightweight carbon fiber and marine grade aluminum construction
- Launch from the shore or small boat
- Li-Ion batteries = long run-time and quick recharge
- Near-coastal operating depth — bays, rivers, lakes (to 180 ft depth)
- GPS (WAAS) position-corrected data at 1 Hz rate
- Built-in moisture detectors with fail-safe emergency buoyancy system for asset recovery
- Integrated location pinger

Water Quality Parameters

Temperature	ROX™ Optical Dissolved Oxygen
Conductivity	Turbidity
Specific Conductance	Chlorophyll
Salinity	Blue-Green Algae (marine or freshwater)
Resistivity	Rhodamine
TDS	Depth
TSS	PAR - Upward-facing
pH	PAR - Downward-facing
ORP	

Pure Data for a Healthy Planet.®

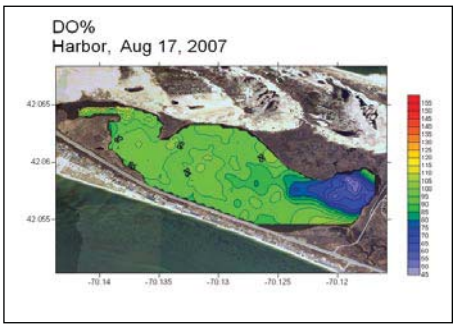
Automated Water Quality Surveys

Mission planning software with an intuitive interface

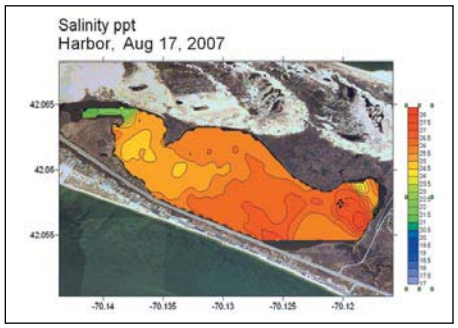
- Simple to use waypoint-based navigation and mission planning
- Select any NOAA or USGS Chart in GEO/NOS format (even geo-referenced satellite images)
- Operator selects measurement depths, speed, sensors, poling frequency, etc.
- Software creates data files to run the mission and organize logging for easy retrieval
- Programmed surveys can be terminated or modified any time the vehicle surfaces
- Easily reconfigurable for new missions or sensors (defined software interfaces)

Screenshot from VectorMap mission planning software showing a "lawnmower"-style mission path drawn onto image of saltwater lagoon.

Place the vehicle in the water and start mission.



Dissolved oxygen data collected from saltwater lagoon mission.

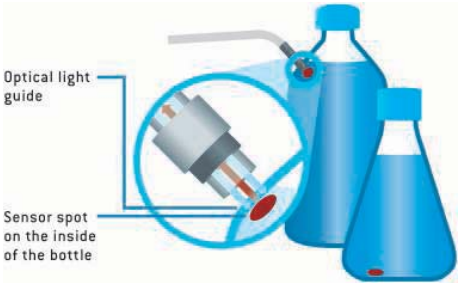


Salinity map of lagoon. Notice the freshwater input in the northwest corner.

EcoMapper AUV Specifications

Dimensions	Diameter	5.8 in, 14.73 cm
	Length	60.1 in, 152.6 cm
	Weight	45 lbs, 20.4 kg
Propulsion System		2-blade cast bronze propeller
Endurance		8 hours at speed of 2.5 knots
Speed Range		1-4 knots
Control		Four independent control planes
External Hook-up		Data: wireless 802.11g Ethernet (up to 200 m comm. distance) Power: 2-pin DC charge voltage in
Navigation		Dead reckoning; differential GPS when on the surface
Tracking		Internal data log; programmable resolution
Software		Microsoft Windows®-embedded operating system, GUI-based navigation suite, mission planning software
Energy		600 WHrs of rechargeable Lithium-Ion batteries (>300 cycles)
Onboard Electronics		Low power X86 processor; 80 GB disk drive for data collection
Communication		2.4 GHz radio link when on the surface to download missions and upload collected data
Option		Imagenex side-scan sonar 330 kHz

Non-Invasive Oxygen Sensors



The non-invasive oxygen sensors measure the partial pressure of both dissolved and gaseous oxygen. These sensor spots are used for glassware and disposables. The sensor spots are fixed on the inner surface of the glass or transparent plastic material and can therefore be measured in a non-invasive and non-destructive manner from outside, through the wall of the vessel. Different coatings for different concentration ranges are available.

Features

- Online monitoring
- Non-invasive & non-destructive measurement
- Measurement range from 1 ppb up to 45 ppm dissolved oxygen
- No consumption of oxygen
- Signal independent of flow velocity
- Measures oxygen in liquids as well as in gas phase
- Autoclavable (SIP: 130 °C / 266°F, 2 atm steam sterilization) & CIP (Cleaning in place)

Sensor Spots

Sensor spots (SP) are the most versatile version of non-invasive oxygen sensors. They are attached to the inner surface of any transparent vessel.

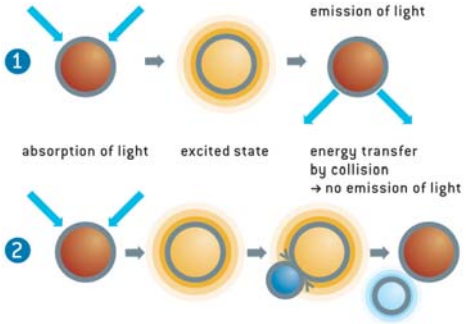
Examples are

- Cultivation bags
- Spinners
- Glass reactors

The transmitter with its optical fiber can be fixed opposite the sensor spot by using our accessories (see accessories brochure) which can be adapted for nearly all kinds of vessels.

Flow-Through Cell

The flow-through oxygen minisensor (FTC) is a miniaturized fiber chemical optical sensor integrated in a flow-through cell. It is connected to the transmitter by an optical fiber. A glass tube with an inner diameter of 2 mm is coated with an oxygen sensor at its inner wall. The volume for liquid inside the FTC is about 100 (±10) microliter. The standard flow cell can be easily connected via Luer-Lock adapters to external tubings.



The Smart Measurement Method

The light from the blue LED excites the sensor spot to emit fluorescence. If the sensor spot encounters an oxygen molecule, the excess energy is transferred in a non-radiative way, decreasing or quenching the fluorescence signal. The degree of quenching correlates to the partial pressure of oxygen in the matrix, which is in dynamic equilibrium with oxygen in the sample. The decay time measurement is internally referenced.

Non-Invasive Oxygen Sensors

	Sensor Type PSt3		Sensor Type PSt6	
Specifications	**Gaseous & Dissolved Oxygen**	**Dissolved Oxygen**	**Gaseous & Dissolved Oxygen**	**Dissolved Oxygen**
Measurement range	0 – 100 % O_2 0 – 1000 hPa	0 – 45 mg/L 0 – 1400 µmol	0 – 4.2 % O_2 0 – 41.4 hPa	0 – 1.8 mg/L 0 – 56.9 µmol
Limit of detection	0.03 % oxygen	15 ppb	0.002 % oxygen	1 ppb
Resolution	± 0.01 % O_2 at 0.21 % O_2 ± 0.1 % O_2 at 20.9 % O_2 ± 0.1 hPa at 2 hPa ± 1 hPa at 207 hPa	± 0.14 µmol at 2.83 µmol ± 1.4 µmol at 283.1 µmol	± 0.0007 % O_2 at 0.002 % O_2 ± 0.0015 % O_2 at 0.2 % O_2 ± 0.007 hPa at 0.023 hPa ± 0.015 hPa at 2.0 hPa	± 0.010 µmol at 0.03 µmol ± 0.020 µmol at 2.8 µmol
Accuracy	± 0.4 % O_2 at 20.9 % O_2 ± 0.05 % O_2 at 0.2 % O_2		± 1 ppb or ± 3 % of the respective concentration; whichever is higher	
Drift at 0 % oxygen	< 0.03 % O_2 within 30 days (sampling interval of 1 min.)		< 2 ppb within 30 days (sampling interval of 1 min.)	
Measurement temperature range	0 – 50 °C		0 – 50 °C	
Response time (t_{90})	< 6 sec.	< 40 sec.	< 6 sec.	< 40 sec.
Properties				
Compatibility	Aqueous solutions, ethanol, methanol			
No cross-sensitivity with	pH 1 – 14 CO_2, H_2S, SO_2 Ionic species			
Cross-sensitivity to	Organic solvents, such as acetone, toluene, chloroform or methylene chloride Chlorine gas			
Sterilization procedures	Steam sterilization Ethylene oxide (EtO) Gamma irradiation			
Cleaning procedures	Cleaning in place (CIP, 5 % NaOH, 90 °C, 194 °F) 3 % H_2O_2 Acidic agents (HCl, H_2SO_4), max. 4 – 5 %			
Calibration	Two-point calibration in oxygen-free environment (nitrogen, sodium sulfite) and air-saturated environment		Two-point calibration in oxygen-free environment (nitrogen) and a second calibration value optimally between 1 and 2 % oxygen	
Storage Stability	2 years provided the sensor material is stored in the dark (- 10 – 60 °C)			

Transmitters & Accessories

Fibox 3/Fibox 3 trace
Fiber optic oxygen transmitter

OXY-4 mini/OXY-4 trace
4-channel fiber optic oxygen transmitter

OXY-10 mini/OXY-10 trace
10-channel fiber optic oxygen transmitter

Fibox 3 LCD/Fibox 3 LCD trace
Fiber optic oxygen transmitter with LCD display

LP-1 Control Panel
The control panel is a device for controlling single-channel oxygen transmitters.

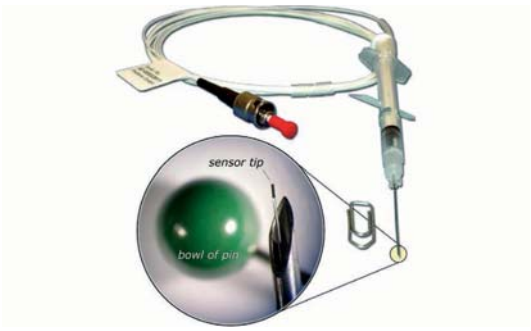
Accessories
A variety of accessories like connectors to different vessels is available.

Oxygen Microsensors

Needle-type oxygen microsensors are miniaturized chemical optical oxygen sensors designed for all research and packaging applications where a small tip size (< 50 µm) and fast response time (t_{90} < 1s) are necessary. The optical oxygen microsensors are based on a 140 µm silica fiber and are available with two different sensor tip diameters, a < 50 µm tapered tip and a 140 µm flat-broken tip. The oxygen microsensors are mounted in different housings (needle-type housing, implantable) and offer a unique research tool for investigating systems where micro-invasive, small and robust sensors are needed.

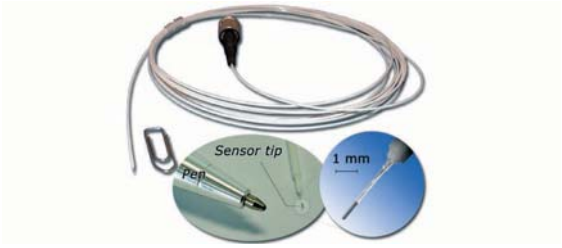
Features

- High spatial resolution (< 50 µm)
- High temporal resolution (t_{90} < 1s)
- Measurement range from 1 ppb up to 22.5 ppm dissolved oxygen
- No consumption of oxygen
- Signal independent of flow velocity
- Measures oxygen in liquids as well as in gas phase



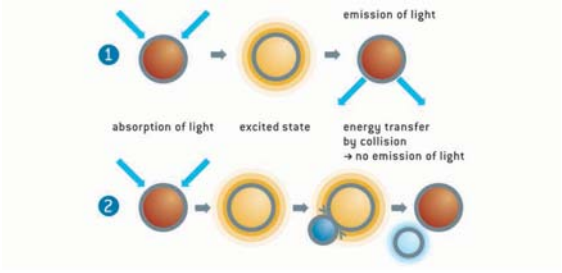
Needle-Type Oxygen Microsensors

Needle-type oxygen microsensors are perfectly suited for measuring oxygen distribution profiles in sediment and biofilms with a high spatial resolution of less than 50 µm. The oxygen-sensitive tip of an optical fiber is protected inside a stainless steel needle. This design is optimal for easy penetration of tissue, septum rubber or packaging materials. After penetration the sensor tip is extended for measurement.



Implantable Oxygen Microsensor

Implantable probes are the miniaturized fiber optic oxygen sensors designed for various customized applications. The tiny probe has a tip size of < 50 µm (TS) to 140 µm (TF) while the outer diameter ranges from 140 µm to 900 µm.
The microsensor tip is not mounted in any additional housing. The bare glass fiber tip can be mounted to your own housings, steel tubes and micro respirometer chambers etc. It can be deployed in sealed containers to measure the oxygen content directly.



The Smart Measurement Method

The light from the blue LED excites the sensor spot to emit fluorescence. If the sensor tip encounters an oxygen molecule, the excess energy is transferred to the oxygen molecule in a non-radiative transfer, decreasing or quenching the fluorescence signal. The degree of quenching correlates to the partial pressure of oxygen in the matrix, which is in dynamic equilibrium with oxygen in the sample. The decay time measurement is internally referenced.

Oxygen Microsensors

	Sensor type PSt1		Sensor type TOS7	
Specifications	**Gaseous & Dissolved Oxygen**	**Dissolved Oxygen**	**Gaseous & Dissolved Oxygen**	**Dissolved Oxygen**
Measurement range	0 – 50 % O_2 0 – 500 hPa	0 – 22.5 mg/L 0 – 700 µmol	0 – 3 % O_2 0 – 28.8 hPa	0 – 1.1 mg/L 0 – 34.5 µmol
Limit of detection	0.05 % oxygen	20 ppb	0.002 % oxygen	1 ppb
Resolution	± 0.01 % O_2 at 0.21 % O_2 ± 0.09 % O_2 at 20.9 % O_2 ± 0.1 hPa at 2 hPa ± 0.87 hPa at 207 hPa	± 0.005 mg/L at 0.09 mg/L ± 0.04 mg/L at 9.06 mg/L ± 0.14 µmol at 2.83 µmol ± 1.3 µmol at 283 µmol	± 0.0009 % O_2 at 0.002 % O_2 ± 0.001 % O_2 at 0.02 % O_2 ± 0.010 hPa at 0.23 hPa ± 0.015 hPa at 2.0 hPa	± 0.4 ppb at 10 ppb ± 0.63 ppb at 200 ppb ± 0.013 µmol at 0.31 µmol ± 0.020 µmol at 6.20 µmol
Accuracy	± 0.4 % O_2 at 20.9 % O_2 ± 0.05 % O_2 at 0.2 % O_2		± 1 ppb or ± 5 % of the respective concentration whichever is higher	
Drift at 0 % oxygen	< 0.1 % O_2 within 30 days (sampling interval of 1 min.)		< 10 ppb within 30 days (sampling interval of 1 min.)	
Measurement temperature range	0 – 50 °C		0 – 50 °C	
Response time TS* (t_{90})	< 1 sec. (gas)	< 2 sec. (liquid)	not available	
Response time TF** (t_{90})	< 15 sec. (gas)	< 30 sec. (liquid)	< 15 sec. (gas)	< 30 sec. (liquid)
Properties				
Compatibility	Aqueous solutions, ethanol, methanol			
No cross-sensitivity with	pH 1 – 14 CO_2, H_2S, SO_2 Ionic species			
Cross-sensitivity to	Organic solvents, such as acetone, toluene, chloroform or methylene chloride Chlorine gas			
Sterilization procedures	Steam sterilization (only implantable & TF** sensor) Ethylene oxide (EtO)			
Cleaning procedures	3 % H_2O_2, ethanol, soap solution			
Calibration	Two-point calibration in oxygen-free environment (nitrogen, sodium sulphite) and air-saturated environment		Two-point calibration in oxygen-free environment (nitrogen) and a second calibration value optimally between 1 and 2 % oxygen	
Storage stability	5 years provided the sensor material is stored in the dark at room temperature (20 °C +/- 5 °C)			

*TS: tapered sensor tip with a diameter < 50 µm and no optical isolation

**TF: flat-broken sensor tip with a diameter of 140 µm

Transmitters & Accessories

Microx TX3 & Microx TX3 trace

Micro fiber optic oxygen transmitter for use with oxygen microsensors.

OXY-10 micro

10-channel micro fiber optic oxygen transmitter for use with oxygen microsensors.

OXY-4 micro

4-channel micro fiber optic oxygen transmitter for use with oxygen microsensors.

LP-1 Control Panel

The control panel is a device for controlling single-channel oxygen transmitters.

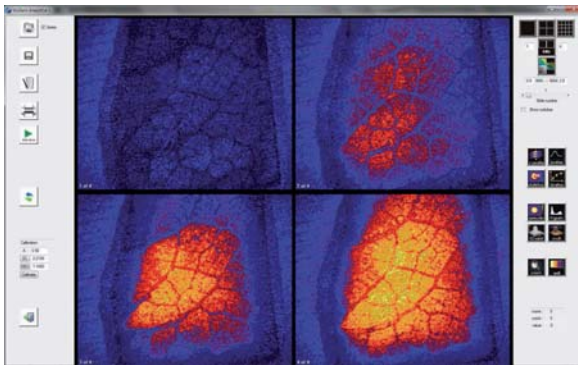
Imaging Solutions

Measure and Visualize Oxygen Distributions in 2D For Biological Research

Fluorescent chemical optical sensor foils combined with imaging technology allow easy 2D visualization of oxygen distributions in heterogeneous samples. For measurement the sample surface is covered with the sensor film, which translates the oxygen content into a light signal. The sensor response is recorded pixel by pixel with a digital camera. With VisiSens spatial and temporal changes of oxygen concentration can be monitored.

Features

- Non-invasive mapping of metabolic activity using sensor foils
- Imaging of living samples
- Be able to influence experiment conditions during measurements
- Reliable addressing regions with low or high oxygen content
- More than 100.000 sensing points within one single image
- USB powered & portable
- Easy evaluation via image processing software

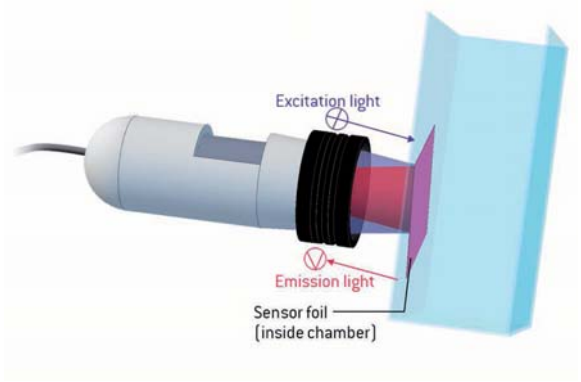


Software

The software allows controlling the image recording process, and assists image processing and evaluation. An easy to use camera controlling user interface manages image acquisition and storage. Measurements which belong together can be organized in user defined sessions as separate folders and annotated with a free text comment. Acquired images can be single images or automatically recorded time series.

Benefits

- Display the sensor response in false color image
- Display the actual pixel information
- Display ROI statistics of user defined polygon ROIs
- Interactive x- and y-axis profiles
- Z-axis profiles for plotting ROI average at defined coordinates
- Follow kinetics through a time series and display as 2D-plot
- Side-by-side image comparison of selected images
- Alpha blending of false color sensor response with color image



The Smart Measurement Method

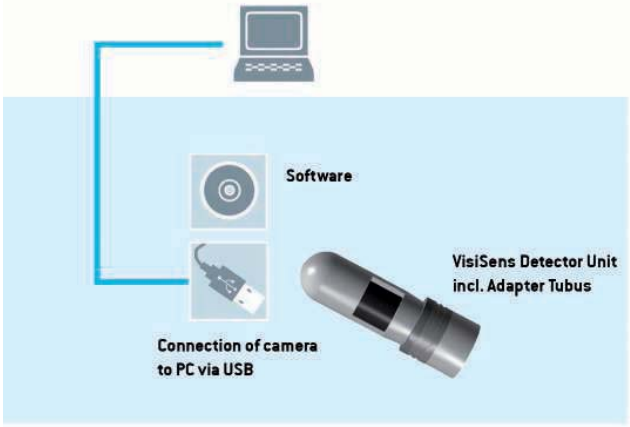
Fluorescence Ratiometric Imaging (FRIM) is a method for reading out the signal of a fluorescent chemical optical sensor. Ratiometric measuring compensates most of the common interferences, e. g. inhomogeneous lightfields. An optical sensor foil contains an oxygen sensitive dye and a reference dye which are immobilized in an oxygen permeable polymer matrix layer. The indicator dye is emitting red fluorescence which is dynamically quenched by oxygen while the reference dye is giving a constant green light signal. These emissions meet exactly the red and green channel sensitivity of a color RGB chip.

Imaging Solutions

Specifications	Oxygen
Measuring range	0 - 100 % air saturation (0 - 20.9 % O_2)
Response time* (t_{90})	30 sec.
Size of sensor foil*	5 x 5 mm^2 to 40 x 40 mm^2
Number of sensing points within one image*	300,000
Properties	
Temperature range	5 °C to 45 °C
Compatibility	Aqueous solutions, ethanol (max. 10 % V/V), methanol (max. 10 % V/V), pH 2 - 10
Device	
Camera chip	Enhanced Color CMOS
Image Resolution	1.3 megapixel (1280 x 1024 pixels)
Magnification	10-fold up to 220-fold, depending on adapter tubus used
Field of View	~ 2.3 x 2.0 mm^2 to ~ 4.1 x 3.3 cm^2; typically ~ 1.5 x 1.2 cm^2
Output	15 fps live video preview (no storage) and 0.5 fps full-resolution picture storage (.png)
Interface	USB 2.0, high speed USB transmission
Number of LEDs	8
Material	All-aluminum housing
Dimensions	Length 10 cm, diameter 3.8 cm
Weight	170 g (without adapter tubus)

*typical data which may strongly differ with adapting the imaging set-up to specific needs

SET UP



ACCESSORIES

Disposables, e.g.
MicroPlates, with Sensor Foil

Sensor Foils

Hoskin Scientific Limited has been supplying testing and monitoring instruments since 1946. Although our range is broad, we focus on three major markets including:

Geotechnical & Materials Testing
Environmental Monitoring
Test & Measurement Instrumentation

Hoskin Scientific operates out of three offices within Canada:

3735 Myrtle Street
Burnaby, BC V5C 4E7
Phone (604) 872-7894
Fax (604) 872-0281
email salesv@Hoskin.ca
800-663-3023

4210 Morris Drive,
Burlington, ON L7L 5L6
Phone (905) 333-5510
Fax (905) 333-4976
email salesb@Hoskin.ca
800-247-3581

300 Rue Stinson,
Montreal, PQ H4N 2E7
Phone (514) 735-5267
Fax (514) 735-3454
email salesm@Hoskin.ca